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UNIVERSITY OF ALBERTA

THE MANAGEMENT OF REFERENCE IN ENGLISH AND MANDARIN NARRATIVE PRODUCTION

(C)

BY

MING-MING PU

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN

PSYCHOLINGUISTICS

DEPARTMENT OF LINGUISTICS

EDMONTON, ALBERTA
FALL, 1991

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SUBMITTED BY Ming-Ming Pu

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF Doctor of Philosophy

IN PSYCHOLINGUISTICS.

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TO THE MEMORY OF MY FATHER

ABSTRACT

The present study is undertaken, partially following Tomlin's (1987) approach, to investigate how speakers choose anaphors to refer to entities already introduced in discourse, and what motivates them to make the rapid decisions they do about whether reference at a current moment should be in the form of a NP or a pronoun/zero during the dynamic time course of discourse production. The general hypothesis proposed for the present study is: "A speaker's anaphoric choice in discourse production is affected by his/her cognitive processes of memory and attention, which is reflected in his/her episodic organization. The speaker is also sensitive to the listener's needs and tries to direct the listener to the right referent by using appropriate signalling anaphors." The hypothesis claims that, constrained by his attentional and memorial resources, a speaker organizes his discourse production as episodes. The speaker uses NPs at episode boundaries to introduce or reinstate reference, and uses pronouns or zeroes to maintain reference within episodes. The alternative use of anaphors also serves as a device to guide the listener to the right referent: NPs direct him/her to establish the new referent and prepares him/her for the change of episode; pronouns/zeroes identify old referents within episode.

An experiment was conducted to test this hypothesis. Forty subjects of the two language groups (English and Mandarin) were asked to describe and later recall a story which consists of three different episodes presented in a sequence of twenty-four pictures. The major findings of the experiment are summarized as follows. First, episodes existing as memory chunks are found to be psychologically real; secondly, episodes as memory chunks represent sustained attention spans, which control speakers' anaphoric choice; thirdly, the influence of humanness and especially that of centrality of humanness as attention factors affects speakers' anaphoric choice; the fourth, the general patterns of anaphoric choice are strikingly similar across the two languages: subjects behaved the same way in their episodic organization and selection of anaphors regardless of where imposed boundaries were positioned and regardless what language they used; and the fifth, language-specific characteristics are also found in the study, i.e. pronominalization differs in the two languages.

The experimental results support the hypothesis of the present study that a speaker's anaphoric choice is determined by his cognitive processes of attention and memory, by his empathy with the listener's needs, and by pragmatic information provided in the discourse context.

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CHAPTER ONE

THE MANAGEMENT OF REFERENCE; A STATEMENT OF THE PROBLEM, AND PRIOR RESEARCH

1.0. Introduction

1.0.1. The Goal of the Present Study

One of the characteristics of connected and coherent discourse is that entities once introduced are often referred to again at a later point. The problem of how reference is managed in discourse production and comprehension, i.e. what motivates speakers and writers to choose a given linguistic form to refer to an item at a given point in a text, has been of interest recently to researchers in linguistics, cognitive psychology, and artificial intelligence. It seems obvious on the surface that during the dynamic flow of discourse production speakers make regular, routine, and presumably automatic decisions regarding the syntactic form taken by their referents. These selections may be made under a number of possible syntactic, semantic or pragmatic constraints.

The central goal of this dissertation is to provide a description of how decisions regarding the form of referential expressions are made in English and Mandarin discourse. While there are extensive studies and research on English speakers' anaphoric choices, comparatively less has been done on that in Mandarin Chinese. Although for the past few decades studies and research on reference management in both English and Mandarin have provided many valuable insights into particular aspects of the problem, no work to date has provided a view of the management of reference in discourse production and comprehension that is at once comprehensive and sufficiently detailed to allow for specific predictions. The present dissertation attempts to fill this gap by examining how the speaker makes decisions regarding referential choices in discourse production. Moreover, the present dissertation attempts a comparative study of reference management in English and Mandarin discourse: How do speakers of the two languages so different in structure behave when they make referential decisions? What are the common phenomena in the management of reference across the two languages and what are the language specific characteristics? The answers to the questions are revealed in the results drawn on data from on-line discourse production tasks and recall tasks. I will argue that the referential choices made by both the English and Mandarin speakers are constrained by cognitive, discourse and pragmatic factors. For narrative production, the cognitive constraints specify the working of memorial and attentional processes during the production. The discourse constraints include the speaker's empathy with the central character, his effort to avoid ambiguity when

switching subject reference, his intention to mark important discourse boundaries, and his need to switch descriptive mood for narration in different scenes. The pragmatic factors include presuppositions and inferences made by both the speaker and listener, the humanness of the referent, and information provided by the discourse context. The analysis and discussion of these constraints will provide important insights into discourse processes underlying anaphoric production.

1.0.2. Overview

The present dissertation is organized in the following way. The remaining sections of Chapter 1 provide a review of the prior studies and research on the management of reference in English and Mandarin. More particularly, two very influential models (the distance model and the episode/paragraph model) concerning the alternation between nominal and pronominal NPs are presented and discussed in detail. The distance model considers the alternation between noun and pronoun to be primarily a function of time, which is manifested by the number of clauses intervening between a given referent and its antecedent (referential distance). The episode/paragraph model considers the alternation between noun and pronoun to be a function of the limited capacity of working memory, which is manifested through its structural organization (i.e. story, episode/ paragraph, event/sentence, unit/clause).

Chapter 2 presents the general theoretical and analytical framework in which the study of the differential use of nominal and pronominal NPs was conducted. The framework is associated with the episode/paragraph model, particularly with Tomlin's (1987) study on the alternation between nouns and pronouns. Based on the cognitive constraints in information processing system, a revised model is presented which argues that the speaker's current activation states and his empathy with his listener's need strongly affect his referential decision. In discourse production, however, it is the interaction of the cognitive, discourse and pragmatic constraints that determine the speaker's anaphoric choice.

Chapter 3 introduces various anaphoric forms of English and Mandarin Chinese to be studied in this dissertation. It also includes a critical assessment of the previous research on Mandarin reference management. The chapter illustrates that although previous studies on the Mandarin anaphoric system provide valuable insights into the problem, none of them can fully account for the speaker's anaphoric choice.

The revised model presented and discussed in Chapter 2 argues that for both English and Mandarin, as well as for languages in general, the speaker will base his anaphoric choice on his and his listener's current memorial and attentional processes and other discourse constraints at any given moment of discourse production.

The revised model of anaphoric choice is tested experimentally for English and Mandarin Chinese. Chapter 4 presents the definitions of some very crucial theoretical concepts applied in the present study such as episode, episode boundary, attention shifts, etc. It then describes the experimental methods used to study the anaphoric selections made by

different groups of English and Mandarin speakers. The data and the results are analyzed and discussed in Chapter 5. General principles governing the referential choice across the two languages and the language specific characteristics are also rendered in Chapter 5.

The revised model, however, only addresses a more general problem in the English and Mandarin anaphoric systems: the alternation between nominals and pronominals. Unlike English which makes extensive use of lexical pronouns and very limited use of zero anaphora, Mandarin pronominalization is more complex and peculiar. Chapter 6 is devoted to the exploration of the Mandarin pronominalization system, investigating how Mandarin speakers make the choice between the use of lexical pronouns and zero anaphora.

Finally, Chapter 7 considers the implications of the results and the model for functional studies of referential management in English and Mandarin, and in languages in general.

1.1. Prior Research

During the dynamic time course of production speakers of any given language must make rapid decisions about whether reference at a current moment should be in the form of a nominal NP or a pronominal NP. Pertinent reviews of this area can be found within the psycholinguistic literature by van Dijk and Kintsch (1983:161-182). They argue that the strategic comprehension of pronouns depends on several kinds of information. The information includes, first of all, the position, function, and morphology of the pronoun itself; secondly, the structures of the sentence, previous sentences, the text, as well as the context; and thirdly, the cognitive representation of these in memory. Finally, it depends also on various kinds of knowledge. For example, Hinds (1977), pointing out that the choice between nominal and pronominal reference in English is not entirely optional, gives an explanation in terms of paragraph structure. Chafe (1976), on the other hand, has discussed the speaker's choice between pronominal and nominal reference in terms of the distinction between "given" and "new" information. He defines "given information" as the knowledge that the speaker assumes to be in the consciousness of the addressee at the time of the utterance; and "new information" as the information that the speaker assumes he is at present "activating" or "re-activating" in the hearer's consciousness. Chafe suggests that in English, and perhaps all languages, "given information" is conveyed in a weaker and more attenuated manner than new information. Thus in English, and perhaps all languages, given or "old" information is weakly stressed and subject to pronominalization, although speakers will tend to avoid the use of pronouns when ambiguity would result.

Clancy (1980), in her analysis of Pear Stories data for both English and Japanese speakers, has discovered that referential choice is influenced by a wide variety of factors, ranging from cognitive constraints (e.g. the

capacity of human short-term memory) to individual preferences. Speakers of both languages preferred inexplicit forms of reference (i.e. pronouns or zero anaphora) for characters who had already been introduced into their narratives. The speakers of English and Japanese apparently feel that inexplicit reference is still comprehensible after the passage of two clauses, or of one sentence. In both languages at least 97% of all inexplicit references were made when no more than one other character had been mentioned (p. 143).

The above discussion shows that a speaker's choice of referential form at any particular point in his narrative will depend on a variety of factors, but at present, exactly how the selection of referential form in discourse production is managed is not fully understood. In the next section, I will present the two general kinds of model (the distance and episode/paragraph models) proposed for comprehension, which seem appropriate for production as well.

1.2. The Distance Model

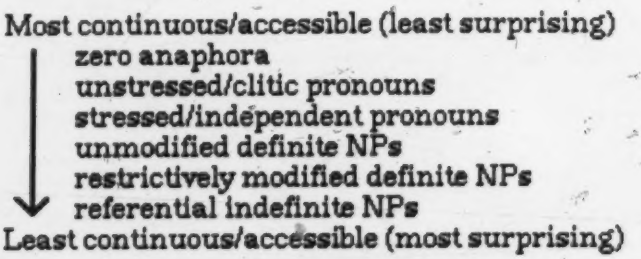
The distance model considers the alternation between nominal and pronominal NP to be a function of the amount of time that has elapsed between the current reference and its antecedent. One manifestation of time in text data is the distance between a given reference and its nearest antecedent. This phenomenon has been well developed by Givon in his topic continuity model (Givon, 1983a; Givon, 1983b). The fundamental assumption of this model is: the more continuous a topic is, the less coding material the hearer requires to identify the topic, and consequently the less elaboration the speaker needs to make. According to Givon (1983:8-9), the factors which influence disruptive or discontinuous topics include:

1. *Distance to last mention*. "If a topic is definite and returns to the register after a long gap of absence, it is still difficult to process. The shorter is the gap of absence, the easier is topic identification; so that a topic that was there in the preceding clause is by definition easiest to identify and file correctly."

2. *Ambiguity from other referents*. "If no other topics are present in the immediately preceding discourse environment ... topic identification is easiest. The more other topics are present in the immediate register, the more difficult is the task of correct identification and filing of a topic."

3. *Availability of thematic information*. "Thematic information available from the preceding discourse could help in topic identification -- especially when other topics in the register may potentially interfere. Such information establishes specific probabilities as to the topic identification within a particular clause and in a particular role."

The first two factors, distance and ambiguity, are the major foci of the studies in Givon (1983). Thus although Givon makes explicit mention of something that sounds slightly structural and hierarchical, the end result is a model that views anaphora as a function of distance and a rather vague notion of ambiguity. Givon's (1983) cross-language study demonstrates that various topic-marking grammatical devices are extremely sensitive to the measures of referential distance and interference (ambiguity). He thus proposes a hierarchy of grammatical devices along a scale of topic continuity which is considered to be highly replicable cross-linguistically. A typical ranking is:



The iconicity interpretation underlying this scale is that "more continuous, predictable, non-disruptive topics/ referents will be marked by less marking material; while less continuous, unpredictable/surprising, or disruptive topics/referents will be marked by more marking material" (Givon, 1983:18).

Givon's distance model for referential choice is intuitively very appealing since referential distances (R.D.) between referents in texts could be manifestations of a psychological factor, i.e. the listener's short-term memory decay effect. The longer the distance, the longer the time elapsed between the referent and its antecedent, the harder it is for the listener to recall the antecedent, and the more often a self-identifiable NP will be used by the speaker. In addition, when the distance between a given referent and its antecedent is only one clause apart, i.e. the antecedent is in the clause immediately preceding, the speaker will most likely use a morphologically and phonologically more attenuated form (a zero anaphor or a pronoun) since he knows that the antecedent is still in his listener's short-term memory and can easily be identified. This is in accord with Givon's (1983) general psychological principle: "Expend only as much energy on a task as is required for its performance" (p. 18). In Givon's cross- language study, the prototypical value for zero anaphora is found to be "1;" and NPs usually have the highest value of referential distance. Pronouns tend to fall between the two extremes, with stressed/independent pronouns appearing in the range of "1.7" and "2," and unstressed pronouns occurring between "1" and "1.2."

However, the value of referential distance reported in Givon's cross-language studies for each category (NPs, pronouns, zero anaphors, etc.) is the average of the values of all the tokens belonging to that category. It

thus results in a serious problem, for the average could be misleading. It is clear that full nouns are actually used when the antecedent is only a single clause away, and pronominal reference can be sustained for more than two clauses. However such cases are usually blurred by the average RD's and little attention has been paid to examining them.

Moreover, although Givon claims the above statement is a language universal, it does not account for the type of language (e.g. Mambia) whose speakers do not make their anaphoric choice on the basis of the two parameters of distance and interference. This type of language "manages reference in terms of a thematic policy" (Grimes, 1978:viii): it distinguishes thematically important (central) characters from unimportant ones by specific set of anaphoric forms. In Mambia, the zero pronouns are reserved exclusively for the central character of a story in spite of the distance and interference between its successive mentions (Perrin, 1978). The presence of a language like Mambia at least suggests that Givon's language universal is necessarily restricted to languages that do not correlate their anaphoric forms with specific sets of referents.

Within the psycholinguistic literature, Clark and Sengul (1979) and others have conducted studies of discourse comprehension in which the time of retrieval of referents in the prior discourse was recorded. Clark and Sengul tested two models of the search process: "continuity" and "discontinuity" models. In the "continuity model," the entities mentioned in a discourse are laid down in memory like beads on a string. The entities are strung one by one as they are mentioned in the discourse. Their order on the string mirrors their order of mention in the discourse. When listeners try to identify the referent of a noun or pronoun, they search these beads from the final one backward. The further back they have to search, the longer they should take and the slower they should be in understanding the present sentence. The "discontinuous model" is like the continuity model except that it has two strings of beads instead of one. The first, and privileged string contains the entities mentioned in the current sentence and one sentence back, while the second string contains the entities mentioned two or more sentences back. The entities for the first sentence back are transferred to the second string when the current sentence is completed, and so all that remains on the first string are the entities from the just-completed sentence. The premise of this model is that the first string, the entities mentioned in the current sentence and one sentence back, has privileged place in working memory and so is readily available for examination, for search and identification. The second string is not in working memory and takes extra time and effort to examine. Part of this string may even lose its identifiability. Their findings argue for the discontinuity model, that is, only the last clause processed grants the entities it mentions a privileged place in working memory. The search time of referents mentioned two or three clauses back are significantly longer than those mentioned one clause back, but there is little difference in search time whether the referent was mentioned two clauses back or it was mentioned three clauses back.

Although the distance model has been supported by data collected from several unrelated languages, many linguists show that some other

important factors may interact with or even overpower the recency effect. Clancy (1980) offers a similar conclusion in her analysis of the Pear Stories data for both English and Japanese speakers, in which cognitive factors of distance and interference are prominent. However she brings out the association between discourse units (e.g. clause, sentence, paragraph, etc.) and use of full noun phrases, and notes that this is in some sense an unusual and optional use of anaphora. "Yet as the exception to these trends reveal, time and interference cannot account for all referential choices" (p. 143). The main discourse structures Clancy finds influencing referential choice are: the tendency to mark discourse boundaries, where a new line of action starts; world-shifts, in which the speaker moves from one mode of talking to another; point of view changes; and episode changes. All these structure-variables tend to be associated with use of nominal reference. On the other hand, Clancy finds that the speaker tries to avoid ambiguity at points of switch reference by use of explicit forms, and to create a particular point of view by using inexplicit reference to background the main character.

The study of van Dijk and Kintsch (1983) also shows that time and interference cannot fully account for referential choice of the speaker. Their experiment is limited to the ways in which the interpretation of a pronoun in sentence-initial position is a function of the representation of previous sentences in the text. The results show that of such proposed factors as recency, syntactic function, semantic function, and topicality, co-topicality is the most powerful. That is, a pronoun will preferably be interpreted to refer to individuals that have been earlier referred to by an antecedent having topic function in spite of the distance and referential interference between the referent and its antecedent. In other words, a pronoun will preferably be interpreted as topic-referential even if the antecedent occurs several sentences back, even if there are several candidate antecedents, even if the antecedent is not in subject position or does not have agent function, and without regard to whether the antecedent occurs in a main clause or subordinate clause.

In summary, the distance model is attractive in its relative simplicity of manipulating text-based quantitative studies, and does capture well some important generalizations about languages and groups of speakers. However, the model clearly cannot account for all of the observed data and other discourse phenomena may be valuable targets of linguistics research.

1.3. The Episode/Paragraph Model

The competing model -- the episode or paragraph model considers the alternation between nominal and pronominal NP to be a function of the limited capacity of short-term memory, which is manifested in the text artifact primarily through its episodic or paragraph structure. Hinds (1977, 1979) argues this for Japanese discourse. By analyzing different types of texts Hinds discusses how paragraph structure controls the choice of noun

phrases and pronouns. He argues that optional pronominalization at the discourse level does not exist, and pronominalization is in fact governed by paragraph level constraints. Hinds defines paragraph as made up of segments which are closely connected strings of sentences that develop the paragraph topic. A segment, on the other hand, contains a single peak sentence and non-peak sentence(s). The choice between nominal and pronominal reference, Hinds suggests, is one way a writer can organize information in order to convey differing degrees of prominence, with nominal reference indicating "semantically prominent" information in peak sentences and pronominal reference indicating "semantically subordinate" information in non-peak sentences.

Van Dijk (1982) also considers the importance of episodes to the syntax of reference. Others have considered the role that the thematic structure of discourse and paragraph have on the selection of referential form (Fox, 1987a, 1987b); Givon, 1983a; Kintsch & van Dijk, 1978; van Dijk & Kintsch, 1983). Fox (1987a) explores the relationship between hierarchical discourse structure and the patterns of anaphora in spoken and written English with two different analytical tools: conversational analysis and rhetorical structure analysis. The former is designed for structurally analyzing spontaneous conversation and the latter for planned expository prose. She demonstrates that structural factors establish the basic patterns of anaphora and the two text-types differ rather strikingly in the distribution of anaphors. Fox (1987b) further analyzes the anaphoric patterning in English narrative discourse. She has shown that a small number of patterns based on the structuring functions in narratives -- such as event-line, development structures, plans and actions -- describe a very large proportion of the anaphors in the texts examined. She argues that approaches which take a more linear view of narrative texts are less than effective in accounting for the anaphoric patterning displayed by the popular written narratives. She maintains that "if we are to understand the use of various linguistic devices in naturally produced texts, we must accept as a major factor in such use the structure of those texts (p. 172)."

One important aspect of the episode/paragraph model considers the alternation of noun and pronoun to be due to differential "focusing," or foregrounding, of a given referent. There are a number of important studies in the psychological, linguistic and artificial intelligence literatures which pursue this complication. Marslen-Wilson, Levy and Tyler (1982) offer a detailed study on the establishment and maintenance of reference by using a relatively constrained form of discourse -- the telling of a story. They argue that the speaker's use of referential devices, throughout the discourse, is governed by the intersection between two major aspects of the process of telling a story: the properties of the narrative itself, and the local context of speaking. They point out:

> The narrative has an overall organization, into sequences of episodes and events, and this determines at which points the speaker needs to make reference to which actors. Given these requirements, the actual deployment of referential devices turns out to be precisely constrained by the local environment in which the devices will have

> to function, and by the extent to which the available intra- and extra-linguistic context can support the requirements of different types of device (p. 355).

Their analysis shows that NPs and proper names are generally used to establish initial reference in an episode when a particular referent is in a state of lower focus. They are only used at all within the episode when a less specific device, such as a pronoun, would have failed. Pronouns, on the other hand, are used to maintain reference within an action sequence when a particular referent is in a state of high focus, or "foregrounded" in a given linguistic context.

The episode/paragraph model makes clear a crucial relationship between an important linguistic unit -- the paragraph and its cognitive correlate, the limited capacity of short-term memory. However the problem lies in the fact that many of the theoretical linguistic notions such as paragraph, focus, episode, foreground, and so on are weakly defined and generally resistant to empirical analysis. For example, in identifying the paragraph as a grammatical unit, Longacre (1979:116) argues that "In this scheme since paragraph is spaced between sentence and discourse, it resembles in certain ways the two contiguous levels. Thus, in certain respects, a paragraph resembles a long sentence on the one hand and a short discourse on the other hand." He further describes the features that mark the paragraph, e.g. particles like "well" and "then" signalling closure for the beginning of a paragraph, identical verb phrases chaining between paragraphs, "terminus" expressions containing verbs of motion (such as "he went away") to mark off paragraphs. Even with these general characteristics of the paragraph it still remains difficult actually to identify paragraphs since many simply do not contain those specific features. Longacre also uses thematic notions such as theme, paragraph topic, etc. to describe a paragraph, but these notions are also not well-defined in linguistics. They have been prone to misinterpretation and have been used in a confusing variety of ways.

Chafe (1985, 1987) and Tomlin (1984-85, 1987) develop the episode/paragraph approach in the following two aspects. First, they argue that the linguistic phenomena which have been given names like "topic," "paragraphs," "given and new information," etc. are manifestations of basic cognitive processes. "We can never understand them fully until we understand the psychological phenomena underlying them" (Chafe, 1987:21). Operationally, Tomlin (1984-85, 1987) defines the notions of paragraph, episode, etc. in such a way that they can be identified independently of linguistic information and can be easily manipulated in experimental studies.

Chafe (1976, 1979, 1985, 1987) represents a very similar point of view concerning referential choice to episode/paragraph approach within linguistics. He argues that our minds contain very large amounts of knowledge or information but only a very small amount of this information can be focused on, or be "active," at any given moment. He tries to construct the idea that a concept may be in any one of three states of activation at a particular time: active, semi-active, or inactive. A speaker normally makes

changes in the activation states of certain concepts which are partially reflected in their referential choices. If a speaker assumes, prior to uttering an intonation unit, that a concept is already active in the hearer's mind, he will verbalize that concept in an attenuated manner, pronominalizing it. If he assumes that a concept is presently being "activated" or "re-activated" in the hearer's mind, he will verbalize that concept in a less attenuated manner, most probably nominalizing it.

Tomlin (1984, 1985, 1987) makes similar claims as Chafe. He ties anaphoric production directly to psychological processes of attention and memory. He argues that the syntax of reference is a function of episode or thematic boundaries which in turn can be seen as a speaker-based re-orientation of attention during the on-line process of discourse production. He demonstrates experimentally that NPs are used to introduce an old character into a new episode no matter how recently the last mention of the character was made, and pronouns are used to maintain a character after it has been introduced into an episode (p. 457)

Though not without problems, Tomlin's study is extremely interesting for it relates the alternation of anaphoric forms to cognitive factors. While the distance model cannot account for the full range of use exhibited by individuals engaged in discourse production and comprehension, Tomlin's episode-attention model makes specific predictions about the performance of individuals as well as groups in discourse production tasks. Tomlin's model is the basis of the present study and will be discussed extensively in Chapter 2.

To sum up, the episode/paragraph model shows a greater sensitivity to subjects or text specific variation than distance between a given referent and its antecedent. Moreover, it articulates a natural connection between a particularly important linguistic unit, the paragraph/episode and its psychological correlate, the limited capacity of working memory.

1.4. Summary

In this chapter, I have offered a review of the previous research on reference management in natural languages. Prior work has shown that referential system is a rather complex issue which should be understood not only as a device of coherence relating the present to the prior text, but also as a manifestation of cognitive processes and constraints involved in production and comprehension. In other words, referential choices may be regarded as stemming from textual representations in episodic memory, the role of episodic situations and other world knowledge, and the capacity limitations of short-term memory. They are actually an integral part of a model of strategic discourse production and comprehension. These issues will be dealt with in the next chapter, where a theoretical and analytical framework will be presented to account for psychological processes underlying anaphoric production.

CHAPTER TWO

COGNITIVE PROCESSES AND THE SPEAKER'S ANAPHORIC CHOICE BETWEEN NOMINALS AND PRONOMINALS

2.0. Preface

This chapter presents a theoretical and analytical framework in which a major part of the present study was conducted, viz. the investigation of the differential use of pronominal and nominal NPs. The framework is associated with the structural model described in Tomlin (1987), which claims that the alternation among anaphoric forms is a function of the structure of discourse -- its thematic organization and its hierarchical structure. The present chapter assesses the validity of the model in the light of cognitive basis of narrative discourse production and comprehension. It argues for Tomlin's model in principle because the current activation states of certain concepts in the speaker's mind do appear to affect strongly the realization of their actual surface forms. This chapter further examines and discusses the weakness of Tomlin's study and presents a revised model of anaphoric choice between pronominals and nominals based on the cognitive constraints discussed in the present chapter.

Since the present study treats only narrative , when the term discourse is mentioned hereafter it is to be understood as short for narrative discourse.

2.1. Tomlin's Episode-Attention Model

Based on the structural approach which suggests that the alternation of anaphoric forms is related to the structure of discourse (Hinds, 1979; van Dijk, 1982; van Dijk & Kintsch, 1983), Tomlin (1987) claims, using data drawn from two independent experiments, that the syntax of reference is directly a function of episodic or thematic boundaries at a relatively local level. The general hypothesis he proposes is:

> The syntax of reference in discourse production is tied directly to psychological processes of attention as reflected in the episodic organization of natural discourse data (p. 458).

Tomlin thus links the linguistic phenomenon directly to attentional factors. The process of attention allocation by the speaker is, as Tomlin claims, reflected in the episodic organization of discourse production. An episode boundary is defined conceptually by Tomlin as:

> a semantic unit in discourse organization consisting of a set of related propositions governed by a macroproposition or paragraph level theme. It represents sustained attentional effort devoted to the macroproposition and endures until attention is diverted; that is, it is sustained until an episode boundary is reached (p. 460).

Tomlin demonstrated experimentally that during the on-line production of discourse, subjects generally used a full noun to reinstate reference across an episode boundary when their attention is diverted, and they used a pronoun to maintain reference within a particular episode when their attention is sustained.

Tomlin also argues that, contrary to Givon's topic continuity model, distance alone cannot account for the speaker's anaphoric choice. His experimental data show that the first mention of an old character after an episode boundary was made with an NP, even if the last mention occurred in the immediately preceding clause, because the episode boundary intervening between the two adjacent clauses caused an attention shift by the speaker. In contrast, the subsequent mention of the same character was made with pronouns (including zero and relative pronouns) until another episode boundary was encountered because the speaker's attention was not disrupted within an episode.

For the purpose of further analysis and assessment, the two independent experiments conducted by Tomlin are introduced and discussed here briefly.

In the first experiment, a set of twenty-one slide pictures was presented to three groups of thirty English speakers, ten in each group. The picture set consisted of five iterations of a basic predation sequence with six different characters whose order of appearance was: bug, bird, cat, dog, chimp, and dinosaur. The predation sequence was presented by four consecutive pictures (as illustrated below in Figure (2.1): a) introduce a new character, b) the new character meets an old character, c) the new (also the larger) character chases the old (also the smaller) one, and d) the larger character eats the smaller one (p. 473).

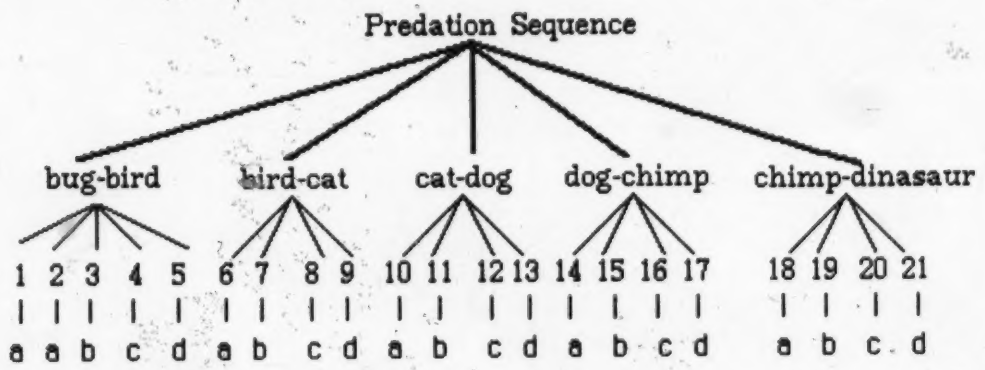

Predation Sequence
bug-bird
bird-cat
cat-dog
dog-chimp
chimp-dinasaur
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
a a b c d a b c d a b c d a b c d a b c d

Figure 2.1. A presentation of the stimulus slides

In the test, subjects were asked to produce a story based on the slides presented as they appear. One group, the singles condition, saw the slides one at a time. The second group, the even condition, saw the slides two at a time except slide one. The third group, the odd condition, saw slides two at a time except slide twenty-one. No real listener was present at the test.

An important assumption for the experiment is that "the shutter release cycle of the slide projector represented a sufficiently strong perceptual disruption for the subject that the subject would be forced to re-orient attention in order to continue with the narrative task" (p. 463). The episode boundary results showed that no matter where the boundaries were put, the proportion of hits (viz. NPs for reinstating a character after the disruption but pronouns in subsequent mentions) remains the same, about 84%. Therefore, Tomlin's general hypothesis that anaphoric choice is a function of attention allocation by the speaker was supported.

The second experiment, using a video cartoon stimulus, provided strong corroborative evidence for the first experimental results. Here ten subjects produced on-line oral descriptions of a 108-second animated videotape about the chasing of a fish by a crab (Tomlin, 1984, 1985). The crab cartoon was independently analyzed as composed of a set of eight major episodes. Episode boundaries were in this case "taken to be perceptually salient breakpoints or disruptions in the flow of visual material" (p. 467). These disruptions were operationalized as video cuts at major scenery changes. This experiment shows a similar proportion of hits of 82% for the episode boundary results. Again in this test, subjects did the on-line oral task without listeners.

The video data and the slides data seem to converge to show that episode boundaries do control the syntax of reference. On the basis of these findings, Tomlin concluded that the alternation of NPs and pronouns is tied directly to the episodic organization of narrative discourse.

The findings of Tomlin's study provide an account of the alternation of anaphoric forms radically different from that offered by Givon's continuity model. The study is especially attractive in three aspects. First of all, unlike previous attempts using the structural model which had not offered a clear and satisfactory definition about the notion of episode, event, clause, paragraph, etc, Tomlin explicitly defines those concepts such as episode and episode boundaries in such a way that can be identified independently of linguistic information. Secondly, unlike the topic continuity model which cannot account for the syntactic forms of reference that fall outside their average region of RD, the episode/attention model accounts for a relatively fuller range of use of the anaphoric forms by speakers. Thirdly, the experimental data for this model were collected during the speakers' on-line discourse production which provide us with a different perspective from text data (written discourse) in studying discourse production. As van Dijk and Kintsch (1983) point out, discourse production is the production of some global speech act, and the goals of this act are controlled by the overall discourse plan. In written discourse, planning may be more conscious, more explicit, and its execution better controlled by the overall plan; while in oral production the overall plan is more prone to changes depending on local conditions. Therefore the spoken

mode seems to be more revealing than the written one about the psychological processes underlying language production in general.

To sum up, it is crucial that the model relates the alternation of anaphoric forms directly to cognitive factors because the model of discourse production and comprehension is actually a cognitive model (van Dijk & Kintsch, 1983). This point is the most important one in Tomlin's study, and the one on which he based his general hypothesis. To justify the point, let us examine, rather extensively, the association between discourse production and comprehension and the workings of memorial and attentional processes.

2.2. The general cognitive framework

2.2.1. The role of memory and attention

Suppose someone witnesses a car accident. We assume that the person constructs a mental representation of that accident, and that his understanding of the accident consists in that process of construction and its memorial consequences. Likewise, when a person hears a story about the same accident, his understanding of such a story also involves the construction of a mental representation of the story. This is the example Van Dijk & Kintsch (1983) used in describing the role of memory in the initial internal representation of discourse processing. In constructing a model of discourse processing, van Dijk & Kintsch argue that the major dimensions of their model are based on the assumption that discourse processing, just like other complex information processing, is a strategic process in which a mental representation is constructed of the discourse in memory, using both external and internal types of information, with the goal of discourse understanding (p.6).

It is certain that a representation of the accident itself (on the part of the witness) and a representation of the story about the accident will not be identical. In the formal case, the speaker begins with the mental representation of the accident and encodes it into a linguistically structured message. It is obvious that the speaker will not merely represent the visual data, such as the movements of objects or persons (events), but rather, an interpretation of the events (Loftus, 1979). In other words, the speaker constructs a meaning: the events are interpreted as 'an accident.' This meaning construction is the semantic aspect of discourse processing which determines the coherence of the discourse production.

On the other hand, the listener begins with the speaker's already coded version of the accident. Since the listener has no direct access to the speaker's intended meaning in producing an utterance, he often has to rely on a process of inference to arrive at an interpretation of utterances or for the connections between utterances. However, both the speaker and listener have more general knowledge about real events or speech acts so that they are able to construct a mental representation , and especially a meaning

representation. They may interpret the events in the light of the previous experiences with similar events, experience that may have led to the more general knowledge about them. In addition to this knowledge, the listener and the speaker may have other cognitive information such as beliefs, opinions, or attitudes regarding such events in general, or motivations, goals, or specific tasks in the processing of these events. On the whole, both production and understanding involve not only the processing and interpretation of external data, but also the activation and use of internal, cognitive information (van Dijk, 1983).

Prideaux and Baker (1986) also discuss the importance of cognitive strategies involved in the production and comprehension of language. They point out that since language processing seems so simple, natural and automatic, we seldom realize how complex they are and what enormous mental resources they require. But "in the early stages of second language acquisition, we become acutely aware of the problem of 'levels of processing' or of 'automatic' vs. 'consciously directed' activities" (p. 10). Psychologists (Slobin, 1979; Clark and Clark, 1977; Brown, 1970) have argued that human language is embedded in a complex network of cognitive abilities. The study of linguistic structures inevitably leads us to questions of the structure of knowledge and of memory. If, for example, the human mind is capable of dealing with only a limited number of explicit or implicit references at a time (i.e. short-term memory constraint), then this limitation will surely play a part in determining the nature of the "rules" for reference in any language. Both of the models of the referential choice (i.e. the distance and the episode/attention model) discussed previously have shown, to some extent, that the use of different anaphoric devices seem to reflect certain cognitive abilities and constraints.

Kintsch and van Dijk (1978) propose that the surface structure of a discourse is interpreted as a set of propositions. This set is ordered by various semantic relations among the propositions. The semantic structure of a discourse can be described both at the level of microstructure and at the level of macrostructure. The former is the local level of the discourse, i.e., the structure of the individual propositions and their relations. The latter is of a more global nature, characterizing the discourse as a whole. The coherence of a discourse is determined at both levels: "A discourse is coherent only if its respective sentences and propositions are connected, and if these propositions are organized globally at the macrostructure level" (p. 364).

Let us assume, first of all, that during discourse production the speaker selects from a set of information stored in his episodic memory - and produced under the control of the macrostructure - one proposition, by introducing it into the short-term memory buffer. This proposition will next be the input into the sentence-formulation strategies: that is, a syntactic form will be constructed on the basis of the semantic (and pragmatic) information as well as lexical and phonological decisions. During these operations, the semantic representation will be kept in the short-term memory buffer because this information will be necessary in the strategic establishment of coherence with the next proposition. The easiest strategy would then be to select from episodic memory a proposition that is

semantically coherent with the proposition already stored in the short-term memory buffer (van Dijk & Kintsch, 1983). This selection is again under the control of the macrostructure.

To examine further the cognitive aspects of language processing, let us view in some detail how psychologists analyze them in the human information processing system. Cowan (1988) offers a especially thorough and critical review of the issues concerning conceptions of memory storage, selective attention, and their mutual constraints within the human information-processing system. He describes in detail the characteristics of memory storage and introduces the alternative views about the relationship between short-term memory (STM) and long-term memory (LTM) processes. The traditional view regards STM and LTM as serial processing: information is transferred serially from sensory store to STM and then to LTM storage (Broadbent, 1958). However, Bower and Hilgard (1981) argue against the traditional view. They point out that pattern recognition and coding processes must take place before information can be entered into STM store and these processes require contact with information in LTM. Shriffrin (1975, 1976) incorporates this view into a revised processing model, claiming that "short-term memory storage consists of the elements within the long-term store that are currently in a heightened state of activation" (p. 164). In other words, short-term storage is the activated subset of the long-term memory. In contrast to the vast capacity of long-term store, the short-term storage seems quite limited. Researchers (Brooks, 1968; Watkins, 1974; Schweikert & Boruff, 1986) have suggested that short-term memory is limited in the duration of storage as well as the number of items. The different capacity limits of short-term storage may result from the interaction of such factors as the decay properties of activation, a possible limitation in how much of memory can be activated at once, and a limitation in what can be included in the focus of attention at one time.

Posner and Snyder (1975a, 1975b) propose that there are two ways in which memory activation can occur, only one of which involves voluntary attention. A concept in memory can be automatically activated by a stimulus, or attentive processes can be directed to the concept. Only the latter mechanism seems to lead to inhibition of nonselected categories. Posner and Snyder (1975b) state that "once a subject invests his conscious attention in the processing of a stimulus, the benefit obtained from pathway activation is increased, and the benefit is accompanied by a wide-spread cost or inhibition in the ability of any other signals to rise to active attention" (p. 66). If concepts "rise to active attention" by virtue of the total activation resulting from automatic and attentive sources together, then automatic activation could redirect the focus of attention in the central executive or elicit an attention call (Schvaneveldt, Durso, and Mukherji, 1982). In other words, there may be reciprocal causal paths: automatic activation may direct attention, and attention may in turn influence the amount of memory activation.

Studies conducted by Fisk and Schneider (1984) and Tyler et al. (1979) indicate that activated elements do not always reach awareness. That is, not all activated elements (i.e., those that remain in short-term memory) enter focal attention. Only those that are of special interest to the subject

will enter his focus of attention. However, the activated elements in short-term memory buffer are always readily accessible.

To summarize, the above discussion has shown the interactive role of memory and attention in information processing. The relations between memory storage and attentional processes are: short-term storage is represented as an activated subset of long-term storage, and the focus of attention is represented as a subset of short-term storage. Figure 2.2. (after Cowan, 1983: p. 180) below is a simple, linear graphic representation of information processing model which clearly and directly illustrates how memory storage and attention work in the processing system.

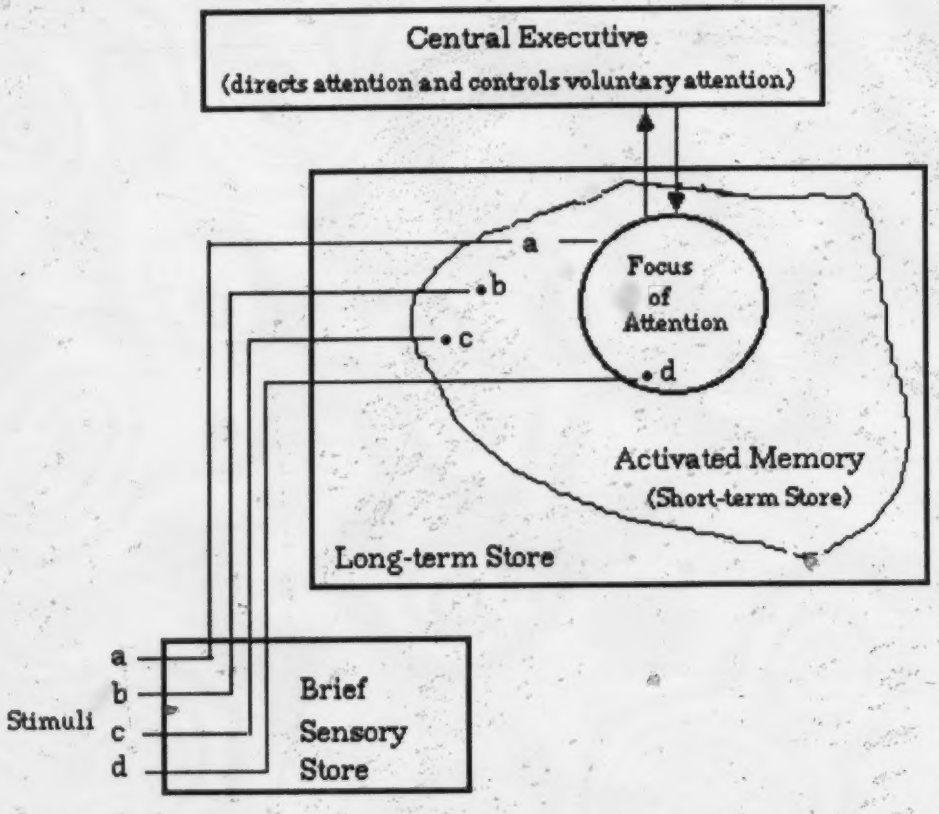


Figure 2.2. A Model of the Information Processing System

The structure and operation of the model are described in Cowan (1983) and briefly summarized as follows. When a stimulus is presented to the subject, it first enters a sensory store that preserves its physical properties for a period of up to several hundred milliseconds. During this period, information in the long-term store has started to become activated. This produces stimulus coding and short-term storage of the activated set of elements from long-term memory. Activated elements corresponding to stimuli that are of special significance to the subject enter the focus of

attention. In other words, they make an attention call to the central executive: the central executive directs the process of voluntary attention, during which elements are intentionally placed in the focus of attention. Other activated elements remain in short-term memory (i.e., they are readily accessible) but outside the focus of attention.

There are several points worth noting here. First, there are limits to activation, both in terms of the number of elements which can be activated at any one time (perhaps two or three) and the duration of activation without rehearsal. Secondly, focal attention is a particularly limited kind of processing state, requiring sustained expenditure of rather limited attentional resources. Consequently, only one or two elements ordinarily receive focal attention at any given time. Third, over a period of time, depending on the general task a subject is engaged in, the allocation of activated memory and focal attention changes, and it changes rapidly. Particular elements move into and out of both activated and focal attention.

Having devoted a considerable part of the present chapter to discussing and clarifying a model of the cognitive framework of information processing, we can now turn to a central issue of this study: the cognitive basis of anaphoric choice.

2.2.2. The cognitive basis of anaphoric choice

The above discussion about the cognitive states of information processing helps to present a picture of what we assume is happening in the mind of a person processing certain stimuli. This section focuses on how the cognitive states of certain concepts affect their actual linguistic forms when a speaker is engaged in a task of discourse production.

Several traditional functional hypotheses can be recast in terms of the independently motivated cognitive states of focal attention and activated memory. For instance, the notion of theme or topic, quite slippery to define in text analysis, seems reasonably replaced by "current focus of attention" in terms of the cognitive model described above. If a speaker wishes or needs the focal attention of the hearer to be on a particular element at a given point in time during the discourse production process, the speaker will, via a specific coding (either structural or pragmatic), direct the focal attention of the hearer to the targeted element.

The problem of referential management is also amenable to this kind of treatment. Traditionally, referential management is taken to require that a given semantic argument also has a pragmatic status like old or given or known information. But these notions, like theme, remain difficult to define and manipulate in text data. Clark and Haviland (1974) once related these notions to memorial processes in their discussion of the "Given-New Strategy." According to Clark and Haviland, each sentence produced by a speaker contains some old, "given" information, and some that is new. The old information serves as an indication of where, in the listener's memory, he will find information related to that conveyed by the present sentence, and thus "an instruction specifying where the new information is to be integrated into the previous knowledge" (p. 105). In other words, the given information specifies a "location" in memory, so that the new information

can be integrated with the old information that resides at that memory location.

There are many limitations on the Given-New Strategy, many situations in which all of the information in a sentence is old or all of it is new. The theory has not been fully worked out. However, it is clear that the information status is tied directly to the memorial and attentional processes. In the present framework, it is the current memorial and attentional status of certain concepts in the unfolding discourse representation which drives the selection of the form of referential expressions.

This is quite congruent with Chafe's (1987) work in which he tries to interpret the notions of given, old, new, etc. in cognitive processes. He discusses in detail some cognitive constraints in information flow on the basis of three activation states: "active," "semi-active," and "inactive" which can be considered to correspond to "focus of attention," "activated memory," and "long-term memory" respectively in the cognitive model previously described in this section. Chafe argues that a particular concept, at a particular time, may be in any one of these three different activation states:

> An active concept is one that is currently lit up, a concept in a person's focus of consciousness. A semi-active concept is one that is in a person's peripheral consciousness, a concept of which a person has a background awareness, but which is not being directly focused on. An inactive concept is one that is currently in a person's long-term memory, neither focally nor peripherally active (p. 25).

Chafe then ties the three activation states with the traditional notions. "Active" concepts are defined as "old" or "given"; "semi-active" concepts as "accessible"; and "inactive" concepts as "new."

So far we have been discussing cognitive processes of language production with only the speaker involved. It might seem on the surface that language production concerns only the speaker and language comprehension concerns only the listener. This view is both superficial and inaccurate. In fact, language production involves both parties of the speaker and the listener, and so does language comprehension. This point is well illustrated in Prideaux and Baker (1986). In natural language processing, a speaker's utterances are determined by many factors: motivational, intentional and structural. It is important to keep in mind that "essentially entailed in the act of a speaker is the logically prior intention of that speaker, i.e. that speaking is a motivated, goal-directed activity" (p. 10). The speaker must take the listener's knowledge into account if the intended meaning is actually to be conveyed. The speaker's assumption about the listener's present knowledge affects both what he says and his choice of structures for saying it. On the other hand, the listener automatically attributes such intentionality to the speaker. His task is "not one of determining what a particular utterance means so much as one of determining what a particular speaker meant when he used that utterance" (p. 10).

In the discourse interaction, the speaker tries to help the listener build an event representation congruent with his own. To do this the speaker must estimate the state of the listener's event representation at any given point in time, and then choose his anaphoric expressions accordingly. If the speaker believes that a concept to which he must refer has already entered the listener's focal attention, he will treat that concept in an attenuated manner, probably pronominalizing it. If the speaker estimates that the concept has not yet been activated, then the speaker will treat the concept in a less attenuated manner and will probably nominalize it.

This is very much in accord with Givon's (1983) general psychological principle in discourse processing: "Expend only as much energy on a task as is required for its performance" (p.18). When the speaker assumes that a concept already has entered the hearer's focal attention, he knows that the listener is currently concentrating on the concept and he need not elaborate on it. He will thus select "a less marking material" (the terminology is Givon's), i.e., a pronoun (or a zero pronoun), to refer to the concept, implying that this is something old or already given, you know what it is and where to find its referent. For example, consider the following:

(1) Joan hurriedly left her house[1] .
(2) She hoped never to return to it.

There is no apparent difficulty for the listener in finding referents for the underlined forms in (2) since they are already in the hearer's focus of attention.

On the other hand, when the speaker assumes that a concept is still in the hearer's long-term memory and is not yet activated, he knows he needs to provide sufficient information about the concept to help the listener process it. He will thus choose a more marking-material (an indefinite noun phrase, perhaps) to refer to the concept, suggesting that this is something new, you cannot find it elsewhere in the utterance context, and I will tell you what it is. For example, consider the following:

(3) I saw a beautiful rainbow this morning.

The listener is not obliged to ask "What rainbow?" in order to interpret the underlined noun phrase since it is self-defining.

Likewise, when the speaker assumes that a concept is already in the listener's short-term storage but outside his focal attention, i.e., it has already been activated at an earlier point in the discourse or has been evoked by a schema, he believes that the concept will still be accessible in the listener's mind. He will then select a nominal form (probably a definite NP or a demonstrative NP) to refer to the concept, suggesting that this is not really something new, you are able to identify it fairly easily. For example, consider the following:

(4) Joan hurriedly left her house.

(5) The door was slammed behind her.

In order to interpret the NP "the door", the listener must search for a previous identification of "a door" in the verbal context of the utterance. In fact, assuming that (4) is the first utterance in the text, there is no explicit mention of "a door". Rather "her house" is given. In our culture, "house" and "door" fall within close semantic range of each other ("house" implies "door") so that the needed referent for the door is actually accessible to the listener in the NP "her house". In other words, "the door" can be readily associated with the evoked schema "her house" in the conversation. In general, the speaker's performance (i.e., anaphoric choice) appears to follow closely both Givon's principle and Grice's (1967) dictum: do not be more informative than required.

To sum up, the above discussion has argued that a speaker's cognitive states together with his estimation about the cognitive states of his listener on a given referent at a given point of time affect his choice of anaphoric forms in any linguistic task. Tomlin's (1987) study has, to a large extent, empirically supported the argument. Other researchers have also given evidence that anaphoric choice is tied to cognitive factors: A speaker will pronominalize a concept which he thinks is already active in the hearer's focus of consciousness (Chafe, 1987, p. 48); and a speaker will use pronouns with the concept still identifiable in the short-term memory buffer (van Dijk & Kintsch, 1983, p. 284).

All this stresses the point that in discourse production, the speaker must take the listener's knowledge into account if the appropriate meaning is actually to be conveyed. The speaker's assumptions about the listener's present knowledge affect both what he says and his choice of structures for saying it. For anaphoric choice, the problem is to find the noun phrase (either a noun or a pronoun) with which the listener can pick out the intended referent uniquely and efficiently. The speaker selects appropriate noun phrases based on his differential focusing of a given referent and a judgement of whether the referent is in the listener's consciousness at the time.

Tomlin's episode-attention model, however, has not accounted for the above stressed point. The model emphasizes only the cognitive status of the speaker and neglects a very important aspect in the speaker's anaphoric choice, i.e., the need of his listener. This problem will be addressed explicitly in the next section.

2.3. Modifications of Tomlin's (1987) model

2.3.1. The weakness of Tomlin's episode-attention model

The present theoretical and analytical framework has argued that Tomlin's episode-attention model is, in principle, plausible and viable.

However, there are some problems with the model, the first of which is whether the model is speaker-oriented or listener-oriented. As has been discussed in the previous section, it is very important to realize the interdependency of the speaker and listener in both language production and comprehension. The speaker must take the listener's knowledge into account if the appropriate meaning is actually to be conveyed. The speaker's assumption about the listener's present knowledge affect both what he says and his choice of structure for saying it. On the other hand, the listener tries to make sense of the speech he hears in terms of what he knows about the speaker and the situation, and the world he lives. The fact that the speaker and the listener are an inseparable part of the information transfer process creates a tension between them: what is easiest for the speaker (i.e. lots of ellipsis, etc.) is hardest for the listener. Therefore for an effective communication to take place, a compromise is required to balance the needs of the two. In other words, Tomlin's model, being a speaker-oriented as he claims, should also involve the part of the listener.

However, Tomlin does not make clear this point and he is not consistent in his study. He claims, on the one hand, that the alternation of anaphoric options is a speaker-oriented process which suggests that the subjects behaved in the expected way because they do not have to deal with a listener. However he notices, on the other hand, that one additional parameter affects the syntax of reference: ambiguity resolution. "Full nouns are clearly used to maintain reference when there exists a possible ambiguity of referential interpretation by the listener" (p. 457). This clearly indicates that the process is at least in part listener-driven. Tomlin does not further stress the point that the speaker actually still empathizes with the need of the listener because it appears to be contradictory to his claim that anaphoric choice is a speaker-oriented process. He finally compromises these contradictory views by eliminating from the data clear cases of ambiguity resolution such as switch subject references. Consider the following excerpt from his experimental data (p. 462):

(6) Even condition: 009

Episode	Proposition	Text
8	21	The ape looks down at the dog
8	22	and the dog starts to run away/
9	23	And then the dog is lying dead
10	24	and the ape looks like he's going to eat him
11	25	and along comes this dinosaur/

If the speaker were not aware of the needs of the listener, he might have used a pronominal form instead of "the dog" in (6-8:22)[2] because he himself was quite clear who "starts to run away." However, if a pronominal were used in this case, the listener would be quite confused as to the referent of that pronominal. The speaker therefore, in the face of this "subject switch," selected a nominal form in order to orient the listener to the right referent. Cases such as this should be treated and explained in line with

memory and attentional processes in Tomlin's model, but he regards them just as "clear cases of ambiguity" and simply filters them out of his data.

At another point, Tomlin treats the data as if he even considers that "speaker-oriented" model should have nothing to do with the listener. He suspects that some of his subjects might have pretended they were telling the story to an audience. When the suspicion was actually confirmed by one subject, he regards the counter-examples produced by the subject as irrelevant. Consider the following (p. 471):

(7) Odd condition: 004

Episode	Proposition	Text
1	1	Once upon a time there was a butterfly
2	2	who saw a little bird
2	2	and greeted it

The relative pronoun "who" in (7-2:2) is regarded as a counter-example to Tomlin's general hypothesis since the first mention of a character in an episode should be a nominal form. Tomlin suggests a "non ad hoc explanation" to account for such counter-examples: the subject reported "she performed the task as though she were reading a storybook to a child. Most of the inter-episode pronominal exceptions were produced by this one subject" (p. 471). The explanation implies that the behavior of this subject is somehow strange, and is one which was not normally expected in this on-line production task. His inconsistency here suggests that he himself is not quite sure whether or not the speaker-oriented model involves the listener.

The second problem involves the stimulus materials which is also related to the first problem: both of Tomlin's experiments dealt with non-human referents which cannot be distinguished by gender in pronominal forms. Subjects had to use nominal forms to differentiate between referents whenever necessary to avoid ambiguity. Consider the following (p. 477):

(8) Odd condition: 003

Episode	Proposition	Text
1	1	There's a butterfly
1	2	flying/
2	3	The bird's talking to the butterfly/
3	4	The bird's chasing the butterfly

The two NPs in (8-3:4) are the first mentions of the referents that occur after an episode boundary. They were therefore considered as hits (instances consistent with the hypothesis). However one could argue that at least one of the NPs was triggered by ambiguity resolution rather than imposed episode boundary. If the characters in the pictures were "John" and "Joan" instead of "the bird" and "the butterfly", subjects might use pronominal forms instead of NPs in (8-3:4) (e.g. He's chasing her) despite the episode boundary. Furthermore, this problem causes confusion in the analysis of

the data: The two NPs in (8-3:4) above were counted as hits after an episode boundary, but the NP in (6-8:22) was treated as a filtered case within an episode boundary. Both cases could be argued to involve ambiguity resolution and they were treated differently in favor of the hypothesis. The experimental results might therefore be confounded by such an analysis.

The third problem involves the identification of episode boundaries. Although episode and episode boundaries have been explicitly defined in Tomlin's study, questions still arise when one examines his data carefully. According to Tomlin, episode boundaries represent major breaks, or attention shifts, in the flow of information, and thus in his first experiment, episode boundaries represent major disruptions (i.e., the shutter release cycle of the slide projector) in the flow of the visual material perceived by subjects. However the analysis of even and odd condition data suggest that episode boundaries represent not only major perceptual disruptions, but may also represent another kind of perceptual disruption in the flow of the visual material: a line between dual pictures presented to subjects. This was demonstrated in subject performances. Some subjects overtly treated the dual slide presentation as if the slides were presented singly (p. 470). Consider the following:

(9) Even condition: 008

Episode	Proposition	Text
2	2	...(.) I think the bird is looking at the fly
2	3	I think maybe he ate it
2	4	the second slide the bird is chasing the fly/

This is a single episode in which the second mentions of "the bird" and "the fly" in (9-2:4) were considered as misses (instances inconsistent with the hypothesis). There was no ambiguity resolution involved here since in (9-2:3) the subject already distinguished "the bird" from "the fly" with pronouns "he" and "it" respectively. Normally the subject would continue to use pronouns to refer to "the bird" and "the fly" since both of the elements seemed to have been put in his focus of attention already. Nevertheless he used two NPs instead. This has left us wondering what counts as episode boundaries. Attention shifts may not only be caused by major perceptual disruptions like video cuts, but also by minor perceptual disruptions such as a line (or even the size, the shape, or the length of a line) which was placed in the middle of a dual picture set.

Finally, the fourth problem of Tomlin's model involves the simplicity of the stimulus materials. The set of 21 pictures consisted of five iterations of a basic predation sequence with six different animal characters: bug, bird, cat, dog, monkey, and dinosaur. The predation sequence was presented by four consecutive pictures (see Fig 2.1.,p. 25): 1) introduce a new character, 2) the new bigger character meets an old smaller one, 3) the bigger character chases the smaller one, and 4) the bigger character eats the smaller one. The experimental stimulus was so designed that there is

no central character in the picture set. Every character is equally weighed in its role. In addition, there is no human character, nor are there any inanimate objects in the pictures. Since no background information is given in the pictures, all we could see for each individual or dual picture set is either a single animal or two animals. Thus we have no way to tell how subjects would behave when dealing with central vs. non-central characters, human vs. non-human characters, and animate characters vs. inanimate objects. Because the experimental stimuli were very simple and artificial, there did not seem to be any natural connection between the pictures as well as the predation sequences (e.g., a dog does not usually eat a cat, and a dinosaur is hardly associated with household pets such as dogs and cats). In a word, it would be very difficult to tell a "story" from the picture sequence because it lacks semantic, pragmatic and contextual information. The simplicity and artificiality of the stimulus material may in fact constrain the way subjects use anaphoric devices in their descriptive tasks. The results would be richer and more valid if the stimuli were designed and presented in a more natural fashion.

In brief, while Tomlin's model has potential in the studies of the syntax of reference, there are certain problems and weakness in the model which need to be addressed in the present study. In the next section, a revised model of anaphoric choice between nominals versus pronominals is presented and discussed.

2.3.2. A revised model of the speaker's anaphoric choice between nominals versus pronominals

The first thing we want to resolve about the model is whether it is speaker- or listener-oriented. As Tomlin (1987) points out, almost all studies of the syntax of reference focus on strategies of the listener, on discourse comprehension, since comprehension studies lend themselves better than production studies to the needed experimental control. It is equally important to understand the strategies used by the speaker in producing discourse, because comprehension and production strategies are by no means the same(p. 457). The present study examines anaphoric choice made by the speaker when he maintains or has to re-orient his attention during discourse production, and the model is therefore considered a speaker-based one.

However, a speaker-based model by no means suggests that it does not involve the listener. In fact, the way of referring is itself a device that the speaker uses to instruct the listener to select precise referents of anaphoric expressions. From the point of view of the speaker, he knows, before making reference to any particular character, whom he has in mind. In other words, since at the moment of utterance the speaker himself needs no further specification of a referent beyond his own idea of that character we can assume that explicit forms of reference (nominals) would be unnecessary if the speaker takes no account of the listener.

In normal discourse, it is appropriate to conceptualize the speaker's referential choices as being based upon his assessment of the listener's

state of knowledge at any moment with respect to a particular referent. Whenever the speaker uses a particular anaphoric form, he gives the listener guidance as to where to find information for that anaphor. For example, if the speaker mentions "she", the listener expects to find more information about "she" elsewhere in the utterance context. The information may be in the immediate situation, or in the listener's focal attention to the verbal context. In any case, the listener expects the guidance to be a help, i.e., that the information about "she" will be recoverable; otherwise the guidance would be a hindrance to comprehension. Helpful guidance would seem to be an "art" normally available to all native speakers of a given language.

This point can be well illustrated with Tomlin's experimental data. Although there was no real listener present during subjects' on-line production task, the speaker still took the listener's needs into consideration, and automatically provided the listener with helpful guidance in his anaphoric choice. This was reflected in the speaker's ambiguity resolution. Consider example (6), which is repeated below as (10):

(10) Even Condition: 009

Episode	Proposition	Text
8	21	The ape looks down at the dog
8	22	and the dog starts to run away
9	23	And then the dog is lying dead
10	24	and the ape looks like he's going to eat him
11	25	and along comes this dinosaur

In (10-8:22), the speaker used a nominal form after the first mention of the character "dog" within an episode, which was obviously to avoid ambiguity as to the reference of the two NPs ("the dog" and "the ape") in that episode. If the speaker was not aware of the need of the listener, he might have used a pronominal form instead of "the dog" in (8:22) because both "the ape" and "the dog" had been activated in his mind and "the dog" at the moment entered his focal attention. However the speaker was not sure which of the two referents would enter the listener's focus of attention, the use of a pronominal might cause confusion on the part of the listener as to the referent of that pronominal. He thus selected a definite NP to play safe, which would surely guide the listener to the right referent. The ambiguity resolution was therefore an actual guide to the listener. Nothing was really ambiguous from the point of view of the speaker himself during his description task.

It is reasonable to assume that the normal speaker of a language automatically takes the need of the listener into consideration with his appropriate anaphoric choice even though the listener is not present. This point can be further illustrated from a different angle: some non-normal speakers are not sensitive to the listener's need even in the presence of the listener. Rochester & Martin (1977) studied how speakers use phoricity and

where they place referents. They chose three groups of subjects in their experiments: twenty normal speakers, twenty schizophrenic patients who showed clear signs of thought process disorder (TD speakers), and twenty schizophrenic patients who showed no such signs (NTD speakers). Each subject participated in three speech situations with a listener present: an interview, a cartoon description and interpretation, and a retelling of a brief narrative. Rochester & Martin (p. 259) found, through analyzing subjects' referring forms, that the normal speaker appeared to make the listener's task easy by using many explicit verbal references (nominals), and by placing implicit verbal references (pronominals) within immediate semantic range of the listener. Similarly, NTD speakers tended to do this, but provided fewer endophoric references and fewer implicit references. The TD speaker, however, seemed to pose a profound problem for the listener: no matter how long the listener searched, he was unable to identify some of the TD speaker's referring expressions.

We can therefore take for granted that the "art" of referring is available to any normal speaker and conclude that the revised model of anaphoric choice is a speaker-based model which is at the same time sensitive to the needs of the listener during the discourse production.

With the above discussion in mind, we can now implement Tomlin's episode-attention model along the lines of the cognitive framework presented in the present chapter. Tomlin claims that nouns will be used to reinstate reference on first mention after the forced boundary and pronouns will be used to maintain reference on subsequent mentions until the next episode boundary is reached. However other factors affecting the speaker's choice should be taken into consideration. First, a referent might be in two different activation states in the speaker's mind after a forced boundary: it may still remain in the short-term memory buffer and still be accessible to the speaker at the moment; or it may not have been activated (or it may have been removed from activated memory) and the speaker has to search it in long term storage. Secondly, as attention is sustained within an episode boundary, the speaker has to disambiguate referents for the listener when more than one referent is in the speaker's focal attention. Finally, when a referent is associated with a certain schema, it will enter activated memory and become accessible to both the speaker and listener although it has never appeared in utterance context. In these cases, the speaker will make an anaphoric choice differing from Tomlin's prediction. However his choice still reflects activation states of his own cognitive domain and is in accord with his assumptions about the listener's current state of mind.

Figure 2.3 on next page is a revised model of anaphoric choice which differs from Tomlin's model in the aspects discussed above.

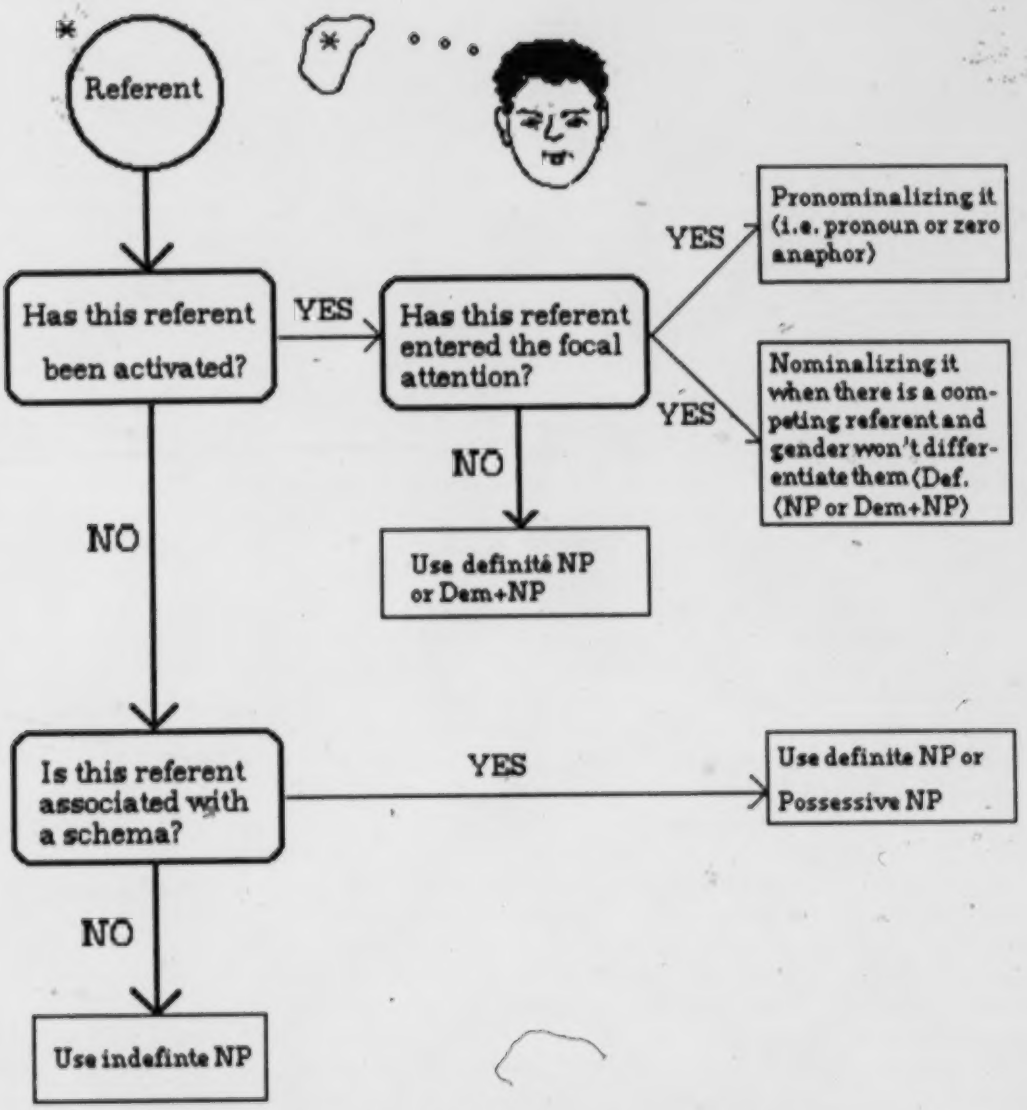

Referent
Has this referent been activated?
YES
Has this referent entered the focal attention?
YES
Pronominalizing it (i.e. pronoun or zero anaphor)
YES
Nominalizing it when there is a competing referent and gender won't differentiate them (Def. (NP or Dem+NP)
NO
Use definite NP or Dem+NP
NO
Is this referent associated with a schema?
YES
Use definite NP or Possessive NP
NO
Use indefinte NP

Figure 2.3. A revised model of anaphoric choice

Figure 2.3. outlines four components of the speaker's use of anaphors to instruct the listener, and portrays the speaker's decision about the referential form of a given referent. We assume that the speaker begins with a referent to be realized in speech. The actual form the referent takes depends on what the speaker's current activation state is about the referent, and what he assumes about the listener's cognitive state by determining whether information necessary to identify the referent in question is available in (a) the focus of attention, (b) the activated memory, (c) an evoked schema, or (d) none of them (i.e., inactive in the long-term memory)[3].

When a speaker is engaged in the sort of on-line production task

described in Tomlin's (1987) study, the revised model hypothesizes that he performs a series of tests. Let us assume that he begins first with a particular referent which has just become activated. The speaker at this time assumes that the concept will still be inactive in the listener's long-term memory. He then chooses an indefinite NP to refer to the referent, which guides the listener to set up reference for the referent. When the referent which remains activated for the speaker is to be realized again in speech, the speaker will choose a definite NP if he assumes that the concept is also still activated in the listener's mind. He will use a pronoun or zero anaphor if the concept has entered his focal attention so that he can direct the concept of interest to the listener's focus of attention as well. However when there are two competing concepts active in the speaker's focal attention and they cannot be distinguished by the gender of the pronoun, he will then use a definite NP or a demonstrative+NP to refer to one of them, or he may use a modifying relative clause to isolate the referent so as to eliminate ambiguity for the listener. When a referent that has never appeared in utterance context is associated with an evoked schema[4] , the speaker will use a definite NP or possessive+NP to refer to it because a schema implies a cluster of interrelated expectations that are accessible to both the speaker and listener in the same cultural context. Finally, as we discussed previously in 2.2.1. there are limits to activation and focal attention both in their capacity and duration. Only two or three elements can be activated, and only one or two elements ordinarily receive focal attention at any given time. When the activated elements include human, non-human and inanimate referents, it is predicted that the human referent, rather than non-human ones, tends to receive focal attention and be pronominalized. When the activated elements are all human referents, the central character, rather than non-central ones, tends to receive focal attention and be pronominalized. Therefore we might see some NPs used within an episode boundary when the attention is sustained, but they are most likely non-human referents or non-central characters which are activated yet still outside focal attention. Those cases actually argue for our hypothesis rather than against it, since only referents in focal attention would be pronominalized. On the other hand, since the allocation of activated memory and focal attention changes rapidly over a period of time, particular elements such as human non-central, non-human and inanimate referents might also receive focal attention depending on changes of point of view, changes of episode, and changes of events, scenes, etc.

When an episode boundary[5] is imposed (such as the shutter release cycle of the slide projector or video-cuts), it represents a sufficiently strong perceptual disruption for the speaker that he is forced to re-orient his attention in order to continue with the task. The referents that are currently in the speaker's focal attention are driven out since his attention has been diverted by the perceptual disruption. Nevertheless, the referents that have been in activated memory do not immediately become fully inactive, but remain in a short-term memory buffer for some time. Their activation can be refreshed very easily. Therefore after such an imposed episode boundary, pronominal forms would not be expected to appear, but

nominal forms would be employed instead: the speaker would select a definite NP if the concept remains in his activated memory; he would select an indefinite NP if the concept is in an inactive state in his mind.

Based on cognitive constraints during discourse production, the revised model of anaphoric choice addresses a processing universal, that is, a speaker's anaphoric choice is controlled by cognitive processes of attention and memory, as reflected in his episodic organization during discourse production. Such a universal should be testable on any language once one specifies the coding forms corresponding to the various referential functions. For English and Mandarin Chinese it is predicted that nominals and pronominals will show up at very specific places depending on the activation status of the speaker and his estimation of his listener's activation states that are congruent with the revised model of anaphoric choice.

2.4. Summary

The present chapter has assessed Tomlin's (1987) episode-attention model with respect to changes of cognitive state of concepts in a speaker's information processing system during on-line narration. It argues, in principle, for Tomlin's claim that the syntax of reference in discourse production is tied to the speaker's psychological processes of attention. It also argues that in choosing anaphoric forms in discourse production, the speaker empathizes with the needs of the listener and tries to guide the listener to select intended referents for those anaphoric forms. The speaker fulfills his goal by assessing the activation states of certain concepts in the mind of the listener: he would use a pronoun or zero pronoun to refer to a concept when he wants the listener to focus on it; he would use a definite NP to refer to a concept when he assumes that the concept has already in an active state for the listener. These points are combined in the revised model of the speaker's anaphoric choice (Figure 2.3, p. 28) which presents a picture of what is happening in the mind of the speaker when he begins to realize a concept in speech, and its effect on the actual linguistic form he employs during the discourse production.

An experimental study will be carried out to test the revised model between the selection of nominals and pronominals made by English and Mandarin speakers in discourse production, and the experimental methods employed in the study are discussed in Chapter 4. Chapter 3 presents both the English and Mandarin referential systems, and a critical view of the previous research on Mandarin reference management.

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[1] All the English and Mandarin Chinese examples cited throughout the dissertation are taken from novels, short-stories, articles in journals and the data of the present experiment. No made-up examples are used.

[2] The notation such as (6-8:22) in the dissertation is used to signal the specific proposition in the example. The first number stands for the example number, the second number stands for the episode number and the third number stands for the proposition number.

[3] Here we do not include concepts which are unknown to the listener, i.e., concepts that are even not in the

listener's long-term storage

[4] Schema (or frame) evocation involves a cluster of interrelated expectations. For example, in our culture. rooms have doors, walls, corners, and roofs. People have arms, legs, hands, and feet. The mentions of doors, hands, arms, etc. presuppose their 'known/given' status or definiteness (see Tannen, 1979; Du Bois, 1980).

[5] The theoretical concepts such as episode and episode boundary will be defined in Chapter 4.

CHAPTER THREE

ENGLISH AND MANDARIN ANAPHORIC SYSTEMS

3.0. Preface

This chapter presents an overview of the English and Mandarin anaphoric systems and discusses the three major devices of reference to be studied in the present dissertation, i.e. NPs, lexical pronouns, and zero anaphors. Previous empirical studies on English anaphors have been discussed to some extent in Chapter 1, and are therefore not repeated here. However prior studies and research on Mandarin reference management are critically examined in the present chapter.

3.1. Anaphora

The term "anaphora" is derived from the Greek "anapherein," which translates as "to re-fer," "to relate," in the literal sense of the Latinate forms "to carry back". In linguistic terminology, the word has two different analytic meanings: (1) it denotes a certain function, namely the activity of "referring" which is performed by means of a variety of word classes such as the "article," the "relative pronoun," etc. (K. Erhlich, 1982:315); (2) it denotes a certain class of expressions, viz. the "third person pronouns." In the present dissertation, the term "anaphor" refers to words or phrases which are used to "point back" in the discourse context to the people, places, objects, times, events and ideas mentioned in spoken and written discourse. The use of such a pointing back device is called "anaphora."

3.2. English Anaphoric Devices

The study of anaphoric devices is of great importance because it helps us understand how a speaker, in an on-going discourse, produces connected and coherent language which is relevant to the subject under discussion on the one hand; and what motivates him choose a given anaphoric form to refer to an item at a given point on the other.

For the purpose of the present study, the English anaphors are classified into three major types in two broad categories: nominals and pronominals. Nominals include Definite NP and Indefinite NP, which are

further divided into several sub-structures. Pronominals include lexical pronouns (only third-person pronouns) and zero anaphora. The structures for each category are taken mainly from the discussion of Givon (1983) and C. Brown (1983). They are most frequently studied anaphoric structures and can be found in many studies of English anaphors. The examples for this section are taken from Arthur Hailey's Hotel (1965).

3.2.1. Nominals

Noun phrases used anaphorically in English consist of Definite NP and Indefinite NP. Definite NPs include Definite article + NP; Demonstrative + NP; Names; NP following possessives or genitives; and NP modified by a restrictive modifier. Indefinite NPs include Indefinite referentials and Existential/presentatives. The two types of NPs are illustrated with examples in the following sections.

3.2.1.1. Definite article + NP

This structure consists in English of the article "the" plus a modified or unmodified NP of some kind. For example,

(1) Most had liked New Orleans because after an initial welcome the city had a way of respecting its visitors' privacy, including indiscretions, if any.

(2) He strode down carpeted corridor toward the Presidential Suite. The St. Gregory's largest and most elaborate suite housed a succession of distinguished guests.

3.2.1.2. Demonstrative + NP

This structure consists of "this," "that," "these," or "those" plus an NP. For example,

(3) At the moment the cause of her concern was a pile of soiled tablecloths. ... With luck they might salvage most of this pile.

3.2.1.3. Names

This structure consists of proper nouns. For example,

(4) The bell boy knocked. There was no acknowledging sound and Jimmy Duckworth repeated the knock, this time more loudly.

3.2.1.4. NP following possessive

This structure consists of any NP which follows either a possessive pronoun or a possessive formed in English by the use of an apostrophe. For example,

(5) The conventioneers had been in and out all evening and, as the hours wore on, their determined gaiety has increased with their liquor intake.

(6) Christine went quickly to the bedside. Once, years before, in her father's office, she had seen a patient in extremis, fighting for breath.

(7) Mr. Wells subdued his struggle. ... The little man's eyes were closed.

3.2.1.5. NP modified by a restrictive modifier

This structure consists of any NP followed by a restrictive modifier, which can either be a prepositional phrase or a relative clause.

(8) At once, there was a response: an eerie moaning that began as a whisper, reached a crescendo, then ended suddenly as it began. ... The moaning which they had heard outside had begun again.

3.2.1.6. Indefinite referentials

This structure consists of an indefinite article ("a" or "an") and a NP or of a plural NP with no particular referent. For example,

(9) The newcomer nodded and from a leather bag, which he put down on the bed, swiftly produced a stethoscope.

3.2.1.7. Existential/presentatives

These structures consist of the "there is/are" type clause such as

(10) There was a light tap at the opened door, and a tall spare man stepped in from the corridor.

or of other presentatives which often begin with a prepositional phrase giving place. For example,

(11) By the hat rack stood Peter.

Both types of indefinite referential and existential do not generally have anaphoric function themselves, rather, they are often used to establish reference for the first time.

3.2.2. Pronominals

English pronominals are of two types: lexical pronouns such as the third person pronouns and zero anaphora. Examples are given to illustrate the two types in the following sections.

3.2.2.1. Lexical pronouns

This structure consists of the use of any of the third-person pronouns in English. It can be used in positions of subject, object, object of preposition, and complement, etc. For example,

(12) Christine Francis had left her own smaller office a few minutes earlier. She had been working late and was on the point of going home.

(13) The chief engineer had connected the free end of the rubber tube to the green painted cylinder. Dr. Uxbridge told him: " ..." Together they arranged the improvised mask around the sick man's face.

(14) There was a house telephone in a maid's closet across the hallway. He went to it and ask for Reception.

(15) The Duchess of Croydon had returned to the living-room after Peter's departure, carefully closing the inner door behind her.

3.2.2.2. Zero anaphora

In English discourse, zero anaphora is not the most common anaphoric device, since it occurs much less frequently than lexical pronouns. The structure of zero anaphora consists of deleting a NP completely. Zero anaphora is syntactically constrained and occurs in most cases only in subject position. For example,

(16) Warren Trent eased awkwardly into the chair which Royce held out, then Ø gestured to the other side of the table.

(17) A moment later the little car swung right, and Ø stopped in the parking area of a modern, two-storey apartment building.

Zero anaphora is often seen used cataphorically in English. For example,

(18) Ø Beckoning Peter into the corridor, she described the change in rooms which the bellboy had told her about.

(19) Ø Sitting beside her on the sofa he pointed to the odd-appearing clock.

3.3. Mandarin Anaphoric Devices

Like many other languages, Mandarin Chinese has various anaphoric devices for establishing and maintaining reference in the discourse. For the present study, Mandarin anaphors are also classified

into three major types in two broad categories: nominals (NPs), pronominals (lexical pronouns and zero anaphors).

3.3.1. Nominals

Noun phrases used anaphorically in Mandarin Chinese include 1) [1] nouns marked by a demonstrative zhe or na ("this" or "that"), 2) nouns marked by a restrictive modifier, 3) personal/proper names, 4) unmodified nouns, and 5) nouns modified by a possessive pronoun. I give examples of all these categories below; all examples used are taken from actual texts.

3.3.1.1. Noun phrases containing "zhe" and "na"

(20) dongfang yuyan xi de nu mishu
east language department of woman secretary

yong juanxiude yingwen zai kapian-shang xiedao:
use pretty English at card on write

"zhu ni nian-qinqin wushi-jiu sui." zhewei
wish you young fifty-nine years this

lao xiaojie dao zheng hui shuanong yinwen danci.
old maiden yet sure know play English word

The secretary of the Eastern Langugages Dept. wrote on the birthday card with her beautiful English hand-writing:"A happy fifty-nine year young birthday." This old maiden surely knew how to play with English words.

(21) Yangqing zhuzhuo zhuang shiwu de baozhuang-zhi. na
(name) touch wrap food of wrapping-paper that

baozhuang-zhi zongshi fengsanzhuo Yangqingde zhuyili.
wrapping-paper always distract (name) attention

Yangqing touched the food wrapper. That wrapping-paper always distracted Yangqing's attention.

3.3.1.2. Nouns modified by a restrictive modifier

(22) na baozhuang-zhi zongshi fengsan Yangqingde zhuyili. ta xiang
that wrap-paper always distract (name) attention she think

ta zhujide zhengshi tamen chang shengchan de nazhong zhi.
she touched just their factory produce RP that paper

That paper-wrap always distracted Yangqing's attention. She thought what she touched was just the paper their factory produced.

3.3.1.3. Names

(23) ta zhaoji-qilai, zuo zhao you zhao, zongsuan
she worry-on left find right find finally

zhuadao le Huar zuo ban. Huar shi Xiaochi
find PERF (name) as company (name) is (name)

de xin xifu.
of new wife

She was worried and looked for company. She looked and looked, and finally found Huar. Huar was Xiaochi's bride.

3.3.1.4. Unmodified noun phrases

(24) Laoyin zhongyu duanzhuo lianpen cong he-tao
(name) finally take basin from river-side

huilai le, ... ba maojin douyidou gua-dao
return PERF OM towel shake hang-up

liangsheng-shang, ba lianpen fang-zai qiang-jiao de
line -on OM basin put-at wall-corner of

zhuantou shang, ...
brick on

Laoyin finally returned from the river-side with the basin, (he) shook the towel and hung (it) on the line, and (he) put the basin on the brick in the corner, ...

(25) Zhener naqi na liangfeng xin, ba xin
(name) pick-up that two letter OM letter

di-gei Laotao, tanle kou qi, Laotao jieguo xin,
pass-to (name) sign a breath (name) take letter

suishou shuai-dao kang-shang, ...
hand throw-to bed-on

Zhener picked up the two letters and passed them to Laotao, and then sighed; Laotao took the letters over and threw them onto the bed, ...

3.3.1.5. Nouns modified by possesives

(26) Zhener shi na dai dade. na nian, zhener na sile.
(name) is aunt bring big that year (name) aunt die
Zhener was brought up by (her) aunt. That year, Zhener's aunt died.

(27) ta ceng you xudou gulu. raner tade gulu zhengming shi
he once have many worries but his worries prove is
duoyude.
unnecessary

He once had many worries. However his worries proved to be unnecessary.

3.3.2. Pronominals

Pronominals are generally defined as pro-forms used as substitutes for nouns or noun phrases (Schachter, 1985:25). They are divided, as in English, into two major types: lexical pronouns and zero anaphors.

3.3.2.1. Lexical pronouns

Lexical pronouns refer to third person pronouns in the present study. They are so called in order to make a contrast to zero anaphors. Quite contrary to English lexical pronouns in Mandarin discourse are used much less frequently than zero anaphora. The third person singular pronouns have no gender distinction in spoken Mandarin, they (masculine, feminine, neuter) all have the same form ta. For example,

(28) Jiang He zhan zai men-wai. ta dai-zhuo maozi, ...
(name) stand at door-side he wear-on cap
Jiang He stood by the door. He wore a cap, ...

(29) chezi tingzhu, xia-lai ge nuren. ta wushi duo sui,...
car stop get-off a woman she fifty over year
The car stopped, and a woman got off. She was in her fifties, ...

(30) yipi da ma kuang ben er lai, ... ta kua-guo
a big horse madly run and come it stride-over

heliu, fei-guo gao shan, ...
river fly-over high mountain

A big horse was running madly, ... it strode over rivers and flew over high mountains, ...

(31) tamen shui ye meiyou tingguo zheyangde quzi,
they who also not listen such tune

ta liaobo-qi tamen bujinde xiaxiang, ...
it stir-up they endless reverie

None of them had ever heard such a tune. It made them lose themselves in a reverie, ...

(32) zhe he yiban zai meiguo zhu jiu de hua-ren
this and usual in America live long of Chinese

zheng xiangfan, tamen chang qibuzijindi yong
just opposite they often subconsciously use

yinyu biaoda ziji jixinde ganshuo.
English express self present feeling

This ran counter to the habit of those Chinese who had been living in America for a long time. They often subconsciously used English to express their improvisatory feelings.

3.3.2.2. Zero anaphors

Zero anaphors are employed very frequently and extensively in Mandarin discourse. They occur in subject position like zero anaphora in pro-drop languages such as Italian and Spanish; and they also occur in object position like zero anaphora in some eastern Asian languages such as Japanese and Korean. A zero pronoun can refer not only to an item in its superordinate clause, but also to an item in the preceding clause as well in the discourse. For example,

(33) Lu Yeming shuo 0 kanjian Shen Xiaofeng le.
(name) say see (name) PERF
Lu Yeming said that (he) saw Shen Xiaofeng.

(34) Q. tamen zai nali gan sheme?
they PROG there do what
R. 0 liaotian bei.
chat EXCL

Q. What are they doing here? A. (They) are chatting.

(35) A. xianzai shichang shang dianshi-ji hen jingqiao.
now market on TV-set very short
Televisions are in short supply in the market now.

B. keshi ta-ge haishi maidao 0 le.
but his-brother still buy PERF
But his brother has still bought (one).

Moreover, the interpretation of zero anaphora in Mandarin Chinese depends largely on semantic, pragmatic and contextual factors, i.e. on the speaker's and hearer's abilities to make inferences beyond what sentences actually say. For example,

(36) a) Ma taitai-de xiao nuer Lili he Xiaoqin
(name) Mrs(Ma)'s little daughter (name) and (name)

tong nian tong yue sheng, b) 0 dou shi ba zu
same year same month born all is eight full

suile. c) 0 zhangde congming linli, d) 0 tiaole
year grow smart lovely skip

yinian xue, e) 0 xianzai shang si-nianji.
one grade now take four-grade

Mrs. Ma's youngest daughter Lili and Xiaoqin were born in the same month of the same year, (both) are eight years old. (She) is very lovely and smart. (She) skips one grade and now is in the fourth grade.

The above passage is about the two little girls Lili and Xiaoqin. The subject of both a) and b) clauses is "Lili and Xiaoqin," but the zero subject of clauses c)-e) refers to Lili only. Syntactically there is no reason the zero anaphor in c)-e) does not refer to both "Lili and Xiaoqin." However we know from the context that Xiaoqin, who is inactive and slow, is just in Grade one. Lili, then, is the sole antecedent of the zero anaphor in c)-e).

3.3.2.3. The cataphoric use of zero pronouns

Besides the anaphoric use, zero pronouns are also used very frequently to refer forward to another pronoun or noun phrase. For example,

(37) 0 jian you ren lai, ta gaoxin jile, 0 zai
see have man come she happy very at

chuang-shang tan-qi bange shenzilai.
bed-on raise-up half body

Seeing someone coming, she was very happy and raised up in her bed.

In (18) the first zero pronoun refers forward to the pronoun ta. Such a use of zero pronouns is somehow parallel to the use of zero pronouns in participial phrases of English (see the English translation of (18) above). That is, the zero pronouns, when used cataphorically, seem to be syntactically conditioned: they refer to the subject in the following main clause. However that is not always the case. Consider (19):

(38) a) 0 ba shuben zhuang ru bao li, b) 0 you kanle yi yan zhuo-
OM book put into bag in again take a look desk

mian, c) tade yanguang liu-xiang antou de shengri kapian.
top his eyes turn-to desk of birthday card

(He) put the books into his bag and took another look at the desk. His eyes turned to the birthday card on the desk.

Both of the zero pronouns in (19) refer to the protagonist of the story Xiangzhi, rather than his eyes, the subject of the clause c). But the whole passage is grammatical and perfectly acceptable. It is easily understood by native speakers of Mandarin Chinese. Such a cataphoric use of zero pronouns is not rare in Mandarin and will be discussed in the present study.

The previous sections have shown the complexity and uniqueness of Mandarin anaphoric system. The next section will focus on how prior studies approach issues of Mandarin anaphors and why none of them seems appropriate to a full account of the anaphoric system.

3.4. Previous Research On Mandarin Referential System

3.4.1. The structural approach

Apart from the research on the management of reference in English discourse production and comprehension, Mandarin anaphoric constructions have also been the focus of interest among linguists. Many have approached the anaphoric system in Mandarin Chinese at the level of discourse structure. Chen (1986) investigates, from a discourse-pragmatic perspective, how referents are introduced into and tracked throughout Chinese narrative discourse. She finds that referents on their first mention in discourse may be encoded in two broad categories: determinate and indeterminate; referents being reinstated in discourse may be encoded by one of the three major types of anaphora: zero, pronoun and NP. Chen shows that the encodings are correlated with different assumptions about the identifiability of the referents, and the saliency of the referents also plays an important role in anaphoric choice. Li (1985) argues that in Mandarin Chinese, the selection of an anaphoric participant (a full noun, a pronoun, or zero) is conditioned by the structure of higher linguistic strata. The syntactic position of a participant in a clause may partially determine where zero anaphor occurs. The semantic status of a participant as human or non-human and as referential and/or definite also play role in governing its morphological realization. At the discourse level, the selection of anaphoric forms is subject to the speaker's consideration of the addressee's ability to decipher reference and his own need to use anaphora as a surface cohesive device to mark a hierarchical structure of the discourse: the

clauses, the topic chain, and the paragraph. Zero pronouns are used as an internal tie among clauses to form a single topic chain, and lexical pronouns are used where there is a major break is semantic continuity to mark the beginning of a separate topic chain.

The structural analysis, much like the episode/paragraph model discussed in Chapter 1, is very attractive since it shows a greater sensitivity to subject and to text specific variation in distance between reference and antecedent, and it shows a natural connection between an apparently particularly important linguistic unit (e.g. topic chain, paragraph, etc.) and its psychological correlate, the limited working memory. While the structural analysis can, to a certain extent, account for the differential use of anaphora in Mandarin, its problems lie in two factors. On the one hand, the critical theoretical linguistic notions, -- paragraph, event, topic chain, even clause are weakly defined and often cause confusion; and on the other hand, the practical identification of such notions in text data depends on relativistic thematic notions of relevance and salience, which are similarly vague.

3.4.2. The application of the distance model

Besides the structural analysis on the Mandarin anaphoric system, Givon's (1983, 1984) distance model has also been applied to Mandarin texts (Sun & Givon, 1985; Pu, 1989). The studies show that the average counts of various anaphoric constructions measured for Mandarin discourse generally fit Givon's model. This suggests that time, as reflected in texts by referential distance (RD), does affect a speaker's choice of different anaphoric forms in general. Table 1 (next page) is taken from Pu (1989:261) which gives the average three measures of referential distance, discourse persistence, and potential interference (Givon, 1983, 1989) on the texts being studied.

Average RD		Average PS		Average PI[2]	
0 ANA.	1.07	0 ANA	1.66	0 ANA	1.07
D.P.	1.44	I.P.	1.45	I.P.	1.13
I. P.	1.93	NAME	1.36	D.P.	1.50
D+N	5.37	D+N	0.70	NAME	1.56
NAME	7.23	D.P.	0.38	DEF	1.60
DEF	9.38	DEF	0.34	D+N	1.70
POS+N	17.34	POS+N	0.29	POS+N	1.97
INDEF	19.94	INDEF	0.18	INDEF	3.00

TABLE 3.1: Average Measures of Various Anaphora

It seems, from the average figures given in the above table, that the selection between nominals and pronominals is a function of time, i.e. the distance between the referent and its antecedent. In other words, pronominals are used when such a distance is shorter, and nominals are used when such a distance is longer. While it must be acknowledged that much of the emphasis on distance and ambiguity in the continuity

hypothesis arises out of a desire to provide quantitative evidence, the problems resulting from such a quantitative measure, which emphasizes unduly the linear nature of texts, need to be recognized. The problems are exemplified in Table 2 (Pu, 1989:265), which shows the distribution of RD within various anaphoric forms.

No.CL #	0 Ana N	I.P. N	D.P. N	D+N N	NAME N	DEF N	Pos+N N	Indef N
1	400	50	11	5	77	63	2	
2	29	6	3	4	34	66		
3		5	2	2	24	8		
4		3		5	18	10		
5		2		4	13	15	2	
6		1			9	16	1	
7				1	7	12		
8					8	7	1	
9				1				
10						9		
11				2	6	1		
12				1	3	14		
13					3			
14					5			
15					2	17		2
16				1	6	5		
17								4
18						11		2
19								
20				1	53	95	29	408
Total	429	67	16	27	268	349	35	416
AveRD	1.07	1.93	1.44	5.37	7.23	9.38	17.34	19.94
SD	0.25	1.16	0.73	4.85	7.32	7.87	6.09	1.09

Table 3.2. Distribution of RD Within Structures

Table 2 shows that despite the average measures provided in Table 1, there are still quite a few nominals (33% of all NPs modified by demonstratives, 41% of all names, and 37% of all definite NPs), which are supposed to be used when the distance is relatively great, occur in minimal distance (1 or 2 clauses). The problem thus identified occurs because the model assumes that attention must be equally distributed, if all that really matters is distance, since there would be no need to indicate to the reader/ hearer that something new is being started, or that something old is being closed off, or that some interruption is about to occur. Thus the degree of continuity of referents as measured by Givon derives from the surface nature of the clauses rather than their textual function.

Actually, not all clauses are equal in their contribution to the measure of continuity, so that the value 1 for any given clause cannot precisely measure the degree of a referent's continuity. For example,

(39) a. Zhener tiansheng you fu hao sangzi. b. ta ai chaing.
(name) born have a good voice she love sing

Zhener was born a singer. She liked to sing.

(40) a. zhe-xia Zhener kedangzong xiabulaitai le.
this-time (name) public embarrass PERF

b. Zhener shi bei yaohanzi-men chonghuailede.
(name) is PM miner-s spoiled

Zhener was embarrassed in public this time. Zhener was spoiled by the miners.

Both (21) and (22) consist of two consecutive clauses and the name Zhener is the only referent in these two clauses. Since the antecedent in (a) is only one clause away from the referent in (b), a pronominal form is expected in both (b) clauses. However we have a pronoun in (21b), but a name (NP) in (22b). In fact the NP used in (22b) indicates a start for something new which breaks the continuity between the preceding and the subsequent discourse, and therefore a pronoun -- "less marking material" (cf. Givon, 1983) would not be sufficient to direct the reader's attention to such a switch.

The above analysis illustrates that Givon's continuity model cannot adequately handle the reference management in Mandarin Chinese and possibly in any natural language because discourse is not just made up of an undifferentiated string of clauses which follow one another in time. Clauses in discourse actually form larger units that perform communicative functions in relation to one another.

3.4.3. Mandarin pronominalization

Pronominalization in Mandarin seems to be rather language specific. Unlike English which uses lexical pronouns extensively and zero anaphora in syntactically conditioned circumstances, Mandarin makes a much lesser use of lexical pronouns in discourse and a principal use of zero anaphora. The peculiarity of the Mandarin pronominalization system has aroused the interest of many linguists, and there has been considerable investigation and discussion of the alternative selection of zero anaphora versus lexical pronouns *(ta)* in Mandarin Chinese. Generally there are two major approaches to the problem: syntactic analysis and semantic-pragmatic analysis.

Li and Thompson (1979) take a semantics-pragmatics point of view and argue that the occurrence of third person "zero-pronouns" in Chinese is a phenomenon that depends on the speakers' and hearers' abilities to make inferences beyond what sentences actually say. In other words, there are no structural properties predicting the interpretation of the referent for zero anaphors but the interpretation of the referent for the unrealized pronoun is inferred on the basis of pragmatic knowledge. With regard to

the occasional appearance of pronouns in Chinese discourse, Li and Thompson show that their occurrence is, in principle, predictable. They propose that the critical factor determining the appearance of a lexical pronoun or a zero pronoun is *conjoinability*, the extent to which a given clause constitutes a single unit with the preceding clause. "The lower the degree of conjoinability between two clauses, the higher is the likelihood of a pronoun occurring in the second clause (p. 334)." However they claim that such a conjoinability principle contains variables dependent upon the speaker's perception of the pragmatic situation.

Likewise, Chen (1984) argues that the occurrence of zero anaphora depends on a combination of syntactic, semantic and pragmatic factors in which the zero anaphora is involved. She proposes two conditions (p. 3) on triggering zero anaphora: the Predictability Condition (PC) and the Negligibility Condition (NC). The PC indicates the ease of predicting the identification of the referent in the context and the NC relates to the need to emphasize the identity of its referent per se. Chen's discussion and exemplification show that the higher the predictablity and the negligibility of a referent, the more likely it is to be encoded by a zero anaphor.

While Li and Thompson (1979) and Chen (1984) discuss the selection of pronominals in Mandarin from a semantic-pragmatic point of view, others approach the problem by examining the syntactic environment in which the alternation occurs. Luk (1977) analyzes coreference relations between *ta* (lexical pronoun) and 0 (zero pronoun) and their possible referents when they occur in simplex, complex, or coordinate sentences and are preceded by simplex, complex, and coordinate sentences. He finds that in general, the order of preference of the nominals is the following: in the same discourse, a nominal in a sentence closer to the occurrence of ta or 0 is preferred over one in a more remote sentence; in the same clause, a nominal in the main clause is preferred over one in a subordinate clause; in the same clause, a subject nominal is preferred over an object nominal.

Huang (1984) also discusses the alternation between lexical and zero pronouns in Mandarin Chinese at the level of syntactic structure. He concentrates on the problem of empty categories within the framework of GB and UG. He treats zero anaphora as two cases: zero subject and zero objects. He argues that a zero subject pronoun is closely tied to the presence or absence of a potential antecedent rich enough in content -- AGR (i.e. the subject-verb agreement inflected in the verb) or an actual NP. In particular, the phenomenon of subject pro drop can occur when there is a rich agreement element, or when there is no such agreement at all. The first case occurs in languages like Spanish and Italian where AGR is rich enough to identify the zero subject pronoun. The second case occurs in languages like Mandarin Chinese and Japanese where a zero subject pronoun is identified by an NP in a superordinate clause. For example,

(41) Italian: e parlano di linguistica.
they-speak of inguistics
(They) talk about linguistics

(42) Mandarin: Zhangsan shuo e kanjian Lisi le.
(Name) say see (Name) PERF
Zhangsan said that (he) saw Lisi.

Further, Huang argues that Mandarin Chinese does not differ from English in allowing zero objects, i.e. both languages prohibit a zero object pronoun. Under Huang's analysis zero objects in Mandarin are not pronominal at all but act as a variable. He therefore contends that the occurrence of empty categories in Mandarin Chinese is governed by syntactic factors.

Huang's syntactic analysis, however, can not offer a full account of the Mandarin pronominalization system. Unlike Huang's description, Mandarin can actually drop object pronouns as well as subject pronouns. For example,

(43) na xuesheng$_i$ zhongyu zhaodao yige 0$_j$ keng
that student finally find a willing

fudao 0$_i$ de jiaoshou$_j$.
couch RP professor

The student finally found a professor who is willing to coach him.

(44) xiaotou$_i$ yiwei mei ren kanjian 0$_i$.
thief think no man see
The thief thought no one saw (him).

The omission of the zero object like 0$_i$ in either (27) or (28) is very common in Mandarin Chinese, and the zero object behaves like pronominals rather than variables (since it is co-indexed with the matrix subject, not object). As a matter of fact, the key issue to be resolved in the present study is not the description of the structure of reference itself, but rather the underlying factors: what motivates the speaker to choose a given linguistic form (e.g. a zero anaphor) to refer to a referent at a given point in discourse production; and how the listener can uniquely identify the referent. Huang's syntactic analysis alone would by no means explain how a zero anaphor differs from a NP in directing the listener identifying its referent in discourse, or how the speaker decides when to use a variable and when to use a pronoun.

To sum up, the above discussion illustrates that Mandarin pronominalization is much of a language specific problem, and the frequent occurrence of zero anaphor in both subject and object positions can hardly be constrained by pure syntactic properties. Although prior research, in particular Li and Thompson's semantic-pragmatic approach, sheds much light on the treatment of Mandarin anaphoric system, it still lacks the power of exhibiting the full range actually used by individuals engaged in discourse processing. The complexity and peculiarity of Mandarin pronominalization deserve a separate investigation from the general study of nominals versus pronominals. The discussion of the

alternative use between lexical pronouns and zero anaphora in Mandarin discourse will be presented later in Chapter 6.

3.5. The present analysis

The revised model of anaphoric choice discussed in Chapter 2 offers a solution to the alternation between nominals and pronominals for languages in general. It argues, quite specifically, that the major determining factor for the alternative selection of nominal versus pronominal NP is a psychological one. The revised model hypothesizes that for English and Mandarin the systematic selection of alternative referential forms between nominals and pronominals can be experimentally induced in speakers through the independent manipulation of activation of referents during a picture-based narrative production task. The model predicts that during the production task, a speaker of English or Mandarin will use a pronominal NP just in case and always when he believes that the referent has been within the activated memory of the hearer. A speaker of English or Mandarin will use a definite NP to refer to a referent when he believes that referent is associated with an evoked schema and easily accessible to the listener; he would use an indefinite NP to refer to a referent when it has not been activated in long-term memory storage; and he would try to eliminate ambiguity for the listener even if certain referents have already entered his focus of attention. When the forced boundary changes his activation states, he would alter his anaphoric choice accordingly. At this point, a pronominal form would not be expected to appear because the imposed boundary causes the shift of attention on the part of the speaker who cannot concentrate at the moment.

As for the issue of pronominalization, Mandarin represents an important kind of case. The question is: once a given referent does enter the speaker's focus of attention, when does he use a lexical pronoun and when a zero anaphor? Unlike the previous studies done on English which do not investigate specifically the alternative use between lexical pronoun and zero anaphor, the present dissertation will devote a whole chapter (Chapter 6) to the issue, where a functional solution to the problem is presented and discussed.

3.6. Summary

The present chapter presents an overview of various English and Mandarin anaphoric forms to be discussed in this dissertation, and critically assesses the previous studies and research on the selection of different anaphora in Mandarin discourse. It also proposes an alternative analysis on the English and Mandarin reference management: the revised

model of anaphoric choice which hypothesizes that the speaker chooses different anaphoric forms (i.e., nominals versus pronominals) based on his estimation of the listener's current memorial and attentional states as well as his own. The model will be experimentally tested and the experimental data will be presented and discussed in the next two chapters.

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[1] Mandarin Chinese has a large variety of claasifiers which must occur with a number (e.g. *yi* 'one,' *ban* 'half,' etc.) amd/or a demonstrative (e.g. *zhe* 'this,' *na* 'that,' etc.) or certain quantifiers (e.g. *zheng* 'whole,' *ji* 'a few,' etc.) before the noun. Therefore in the examples provided in this section, the nouns modified by a demonstrative pronoun are always preceded by a classifier. For example, *na ge ren* ('that man'), *zhe ke shu* ('this tree").

[2] RD: Referential Distance; PS: Persistence; PI: Potential Interference; Ana: Anaphor; D.P: Demonstrative Pronoun; I.P: Independent Pronoun; D+N: Demonstrative+Noun; Def: Definite NP; Pos+N: Possessive+Noun; Indef: Indefinite NP; CL: Clause (See Givon, 1983).

CHAPTER FOUR

EXPERIMENTAL STUDY

4.0. Preface

Chapter Three presented both the English and Mandarin anaphoric devices to be studied in the dissertation. The present chapter investigates how speakers of English and Mandarin Chinese use those devices in discourse production. An experiment was conducted to elicit speakers' anaphoric choice during an on-line oral narrative production task and a related recall task. The experimental design and procedures are presented below, together with the data obtained from the two experimental tasks. The significance of these data to the experimental hypothesis is discussed in Chapter Five.

4.1. Some Theoretical Concepts and the Hypothesis

The theoretical concepts of "episode," and "episode boundary" are of great importance to Tomlin's model and to the present study. It is crucial to define and identify an episode and an episode boundary before one can attempt to demonstrate that the episodic organization of natural discourse production is a manifestation of cognitive processes of attention and memory affecting the speaker's anaphoric choice.

4.1.1. Episode and episode boundary

Van Dijk and Kintsch (1983:204) define an episode as a sequence of sentences dominated by a macroproposition, a proposition that is derived from the sententially expressed propositions of a discourse. Macropropositions are generally topical expressions pertaining both to the global/macro structures for the discourse as a whole and to topically coherent parts of discourse, i.e. episodes. For example, *X is taking a plane* is the macroproposition of the sequence:

X goes to the airport, X checks in, X waits for boarding, ...

The macroproposition relates sentence propositions at a higher level and thus derives the global meaning of an episode or a whole discourse from the local sentential meanings of the discourse.

The notion of episode or paragraph as a semantic unit dominated by a macroproposition has been extensively investigated and discussed both in linguistics (Longacre, 1979; Schank and Abelson, 1977; Hinds, 1979; van Dijk, 1982b; van Dijk and Kitsch, 1983) and in psychology (Black and Bower,

1979; Haberlandt, Berian and Sandson, 1980). They regard an episode (as a semantic unit) as a subgoal, which consists of the actions that attempt to obtain that subgoal and the outcome of those actions.

If episodes exist as separate chunks in memory, the cognitive processes of memory and attention might be assumed to be different at the episode boundary from those operative within an episode. This may be reflected in actual discourse production in that at the beginning of an episode, we may expect different agents, places, times, objects or possible worlds to be introduced since each episode is subsumed by a different macro-proposition. Van Dijk and Kitsch present some topic change markers typical of the beginning of new episodes (1983:204).

1. Change of possible world: X dreamt, pretended, ... that...
2. Change of time or period: The next day, ... the following year, ...
3. Change of place: (In the meantime) in Amsterdam, ...
4. Introduction of new participants
5. Full noun phrase reintroduction of old participants
6. Change of perspective or point of view
7. Different predicate range (change of frame or script)

Episode boundaries are also the focus of interest in psychological studies of story processing. Black and Bower (1979) successfully demonstrated in their experiments the existence of episodes as chunks in narrative memory. Their experiments yielded three basic results. First, episodes in stories are stored as separate chunks in the memory representation of the story. Second, adding related but relatively unimportant actions to a story episode increased the recall probability of the important statements in the episode. Third, the recall probability of a general superordinate action in a story increased with the number of subordinate actions that further specify it. R. Guindon & W. Kintsch (1982), in their experiment studying macrostructures, find that macrostructure formation appears to be an almost automatic process. People try to form macrostructure during reading and derive relevant macropropositions of a passage as soon as possible (because of the specific monitoring role of macropropositions). Their findings give evidence for the "episode" and the "macrostructure" theories of van Dijk and Kintsch (1978) and Schank and Abelson (1977).

In other studies of story processing (Mandler and Jonson, 1977; Kintsch, 1977; Haberlandt, Berian & Sandson, 1980), show that readers take longer at or around the episode boundary than would be predicted on the basis of sentence level and text-level factors. The boundary hypothesis derives from these findings. The boundary hypothesis assumes that there are cognitive processes at or around the boundary statement/node which are not present at the inside statements/nodes of the episode. At the beginning of an episode, several overlapping cognitive processes may occur. Haberlandt, B. & S. (1980) tested the boundary hypothesis. The results of their experiments with reading and recall support the hypothesis that the encoding load was greater at the boundary nodes than at the remaining nodes of an episode; i.e., readers are sensitive to episode boundaries and

they use them in encoding story information. First of all, the beginning contains the initiating or topical event of the episode (Kintsch, 1977:41), which is so important that a reader devotes a special effort to encoding it. Secondly, at the beginning, the reader identifies the protagonist of the episode and establishes a new memory location for the protagonist. Third, at the beginning, the reader is assumed to shift his/her perspective even when the protagonist remains the same. Finally, at the beginning of a new episode, the reader lacks the expectations that facilitate inference processes. Without such expectations, the beginning is essentially an isolated node. Moreover the recall studies show that people retrieve episodes as integral units, which again provides evidence for the validity of the episode as a macro-unit of narratives.

The experimental findings discussed above show that an episode is a semantic unit which consists of a sequence of related propositions governed by a macroproposition. Since an episode is a memory unit, it represents sustained attentional and memorial effort devoted to the macroproposition and endures until an episode boundary is reached. On the other hand, episode boundaries represent major breaks, or attention shifts (e.g. change of possible worlds, change of major scenery, change of perspective, etc.) in the flow of information in discourse. However, as Tomlin (1987:461) points out, a major difficulty for linguists investigating phenomena involving episodes is that: "for experimental work on discourse production, ... text-oriented symptoms of attention shifting cannot be utilized in identifying episodes in discourse data without risking circularity in functional argumentation."

Following the general insights on event perception by Newston and his colleagues (1973, 1976, 1977), Tomlin (1987) identifies episode boundaries in the stimulus materials for his experimental studies as major disruptions in the flow of the non-linguistic visual material perceived by subjects. Presumably "video-cuts accompanied by major scenery changes" cause attention shifts which trigger episode boundaries in subjects' perception. As discussed above, if episodes represent memory units which involve memorial and attentional effort, and if such cognitive processes at or around episode boundaries are different from those within them, then the differences in the cognitive activities for episodes and episode boundaries will be reflected in their linguistic realization, e.g. differences in the use of anaphors in discourse production at or around an episode boundary, in contrast to within an episode.

The present study draws on the discussion of Newston et al. (1973, 1976), van Dijk and Kintsch (1983), and Tomlin (1987) about episode and episode boundary, and defines them as follows:

> *Episode.* An episode is defined conceptually as a semantic unit in discourse organization dominated by a macroproposition. It is cognitively a memory unit/chunk in the flow of information processing. Attention is sustained in an episode until an episode boundary is reached.

Episode Boundary. Episode boundaries are usually marked by major changes in time, place, scenery, perspective, possible world, participants, etc. in typical narrative discourse. They represent attention-shifts in cognitive processes. For the present experimental study, episode boundaries in discourse production are triggered by attention shifts caused by perceptual disruption (video-cuts) in the flow of visual material.

4.1.2. The hypothesis

Chapter Two has presented a general theoretical framework concerning the key issue of the present study: a speaker's anaphoric choice in discourse production is a reflection/manifestation of cognitive processes of attention and estimation of the listener's knowledge. Following Tomlin's (1987) study and the present theoretical framework, the general hypothesis proposed for the present study is formulated as follows:

> A speaker's anaphoric choice in discourse production is affected by his cognitive processes of memory and attention which is reflected in his/her episodic organization during discourse processing. The speaker is also sensitive to the listener's current needs and tries to direct the listener to the right referent by using appropriate signalling anaphors.

The hypothesis claims that a speaker's anaphoric decision is tied to his psychological processes of memory and attention, and his empathy with the listener's needs. Such cognitive activities, as discussed in the previous section, will be reflected in the speaker's episodic organization of his discourse. The episode, as a memory unit, represents sustained attentional effort, and cognitive processes are different at an episode boundary and within an episode. Within an episode, when the speaker's attention is sustained, he uses a NP to introduce the referent mentioned for the first time, and the NP directs the listener to establish the new referent. He uses a pronoun to maintain reference and the pronoun directs the listener to identify the old referent in a certain memory location. The speaker may also use a NP within an episode boundary if a pronoun is not sufficient to disambiguate referents for the listener. Between episodes, that is, when an episode boundary is reached, the speaker uses a NP to reinstate reference because attention focus is being disrupted, and several overlapping cognitive processes may be occurring at this point. The speaker then needs to reorient his attention in order to continue his production task. At this point, the listener's needs may not be the primary concern of the speaker because his own needs to continue processing seems to be more urgent. However speaker's shift of attention, as realized by more marking material, is also assumed to serve as signals of episode change for the listener. In other words, within an episode where no referential ambiguity results, less marking material (e.g. pronominals) is sufficient for both the speaker and listener to manage reference as long as attention is sustained; but at an episode boundary, when attention is disrupted, more marking material

(e.g. NPs) is required to draw attention to the new episode, and the marking material prepares the listener for the change.

In accord with the hypothesis proposed above, we expect that in the present experimental study, NPs will be used specifically in one of the following three cases: 1) for the first introduction of a referent, 2) for reinstating reference at episode boundaries, and 3) for disambiguating reference within an episode when gender of pronouns cannot come into play.

The next section will describe in detail the experimental methods used in the present study.

4.2. Experimental Methods

4.2.1. Stimulus materials

The stimulus materials for the study consist of adaptions of three excerpts from a children's picture storybook (no text) by Fernando Krahn (1981). The storybook is about a day's activities of a mischievous, unpredictable, but lovely boy named Alex Pumpernickel, presented by vivid and witty illustrations. The book consists of eight short stories, treated as natural episodes in the present study because each describes the activities of a certain period of time during a day in little Alex Pumpernickel's life. Each natural episode is given a title of the activity, with a picture-clock denoting the time of the day.

The three natural episodes adapted for the present experimental study are called: 1) Alex Pumpernickel ... in a sticky situation (time: 12:00 p.m.), 2) Alex Pumpernickel ... swats (time: 2:00 p.m.), and 3) Alex Pumpernickel lends a hand (time: 10:00 a.m.). In the first episode, Alex breaks a window while playing tennis with a girl in his backyard. He climbs through the broken window into the kitchen to find the tennis ball, which has fallen right in a pot of candy cooking on the stove. With the help of the girl Alex is able to scoop the ball out of the pot with a long string of sticky candy attached, which both of them enjoy very much. In the second episode, Alex is swatting a fly enthusiastically in the living-room. He accidentally hits his father who is sleeping on a couch with a pile of newspapers covering him. Alex then busies himself looking for the fly in the pile of newspapers, ignoring his father's puzzled look. He rummages and scrambles among the newspapers, tears them into pieces and throws them up in the air; they fall all over his father. Just then the fly flies out from behind a framed picture on the wall and Alex continues to pursue it, leaving his father covered with newspapers and amazement. In the third episode, Alex meets an old lady while walking on the street. The lady carries two heavy shopping bags, which arouse his curiosity. He offers help and carries one bag the lady gives him. He walks slowly behind the lady until she is out of sight. He then opens the bag to see what is inside. Out jumps a lobster which bites him on the hand. Frightened and pained, Alex

sweats all over. However he has to hide his bitten hand in his clothes and catch up to the lady with the bag on his shoulder. It looks like he is trying to swallow a sob. The story pictures for these three episodes can be found in a reduced size in Appendix A of the present dissertation.

These three episodes were chosen because each of them consists of a central character (little Alex) and a non-central human participant (a girl, a man, and a lady respectively). This allows examination of how subjects select anaphors for central versus non-central characters. Since English has gender difference for pronouns, we will be able to see how English subjects behave when pronouns can distinguish between characters (in the first and the third episode), and when pronouns cannot distinguish between characters (the second episode). The three episodes were chosen also because they contain non-human characters and important inanimate objects such as the tennis ball in the first episode, the fly and the pile of newspapers in the second episode, and the bag and the lobster in the third episode, which subjects cannot leave out in their narrative tasks. Thus we will be able to discover if speakers differ in their anaphoric choice between human and non-human referents.

Each of the three natural episodes consists of eight pictures which are presented in pairs on each page. The original pictures are black and white. The three episodes (twelve pairs of pictures) chosen from the storybook were xeroxed and optically scanned with a Macintosh computer into a picture file. The file was then adapted into a black and white video program which could be viewed directly as a cartoon sequence from a Macintosh screen. The title and the picture clock on the first page of each episode were removed from the picture sequence because it seemed that the name of the central character and the title of the episode might affect subjects' anaphoric choices. For example, subjects might use the name "Alex" instead of "a boy," "the boy," "he," etc.; the existence of a name itself might suggest that Alex is the central character of the story; and the title might suggest the beginning of an episode, which subjects might or might not recognize in its absence. It was hoped that the pictures themselves give as little presupposition to subjects as possible, so that rich and uncontaminated data would be collected for the study.

4.2.2. Experimental conditions

The purpose of the present experiment was to induce subjects' anaphoric choice at episode boundaries and within episodes by imposing artificial episode boundaries for the subjects engaged in narrative production. As noted above, the video program consists of a sequence of 12 pairs of pictures designed for manually controlled play. That is, subjects have to press the mouse of the Macintosh computer to advance from one picture to the next. The transition between pairs takes approximately 3 seconds. At the moment the mouse is pressed, the click of the mouse and the noise coming from the computer as it runs to change pictures are clearly audible. As it was noted previously in the chapter, the brief interrupting period (3 seconds) between the video-cuts, together with the click of the mouse and the machine noise, provide strong visual and

auditory disruption of attention for the subject. The disruptions thus serve as imposed episode boundaries, which force the subject to re-orient his/her attention so as to continue with the production task. Such a cognitive activity -- attention shift -- should be reflected in the subject's linguistic performance. That is, according to the hypothesis, the selection of anaphors should be different at an imposed episode boundary and within an imposed episode.

Two experimental conditions, Even and Odd, were set up by different presentations of the picture sequence to test the theory of attention and reference management. In the Even condition, the picture sequence was presented in the original pairs; that is, there are twelve imposed episode boundaries, and the three natural (or original) story episode boundaries coincide with three of the twelve imposed episode boundaries. The presentation of the pictures in the Even condition is illustrated in Figure 4.1. below.

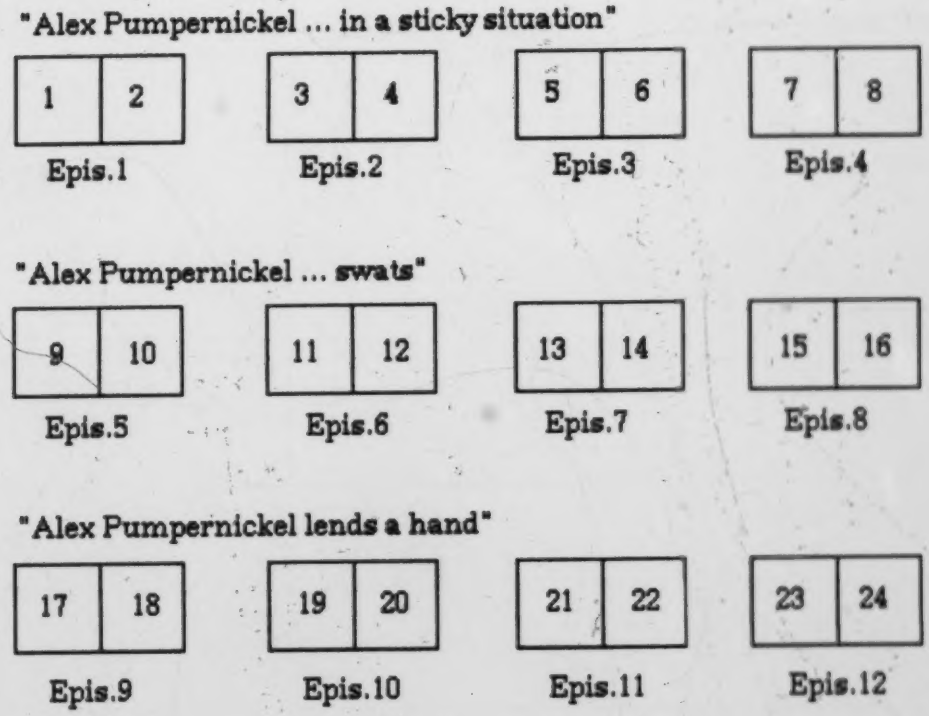

Figure 4.1. Even Condition

In the Odd condition, the picture sequence was presented differently: the first single picture of the first episode ("Alex Pumpernickel ... in a sticky situation") was presented alone and the rest of pictures still in pairs, with the last single picture of the last episode ("Alex Pumpernickel lends a hand") also presented alone. There are therefore thirteen imposed episode boundaries in the Odd condition, and the two natural story episode

boundaries embedded within three of the artificial episodes. The presentation of pictures in the Odd condition is illustrated in Figure 4.2. below.

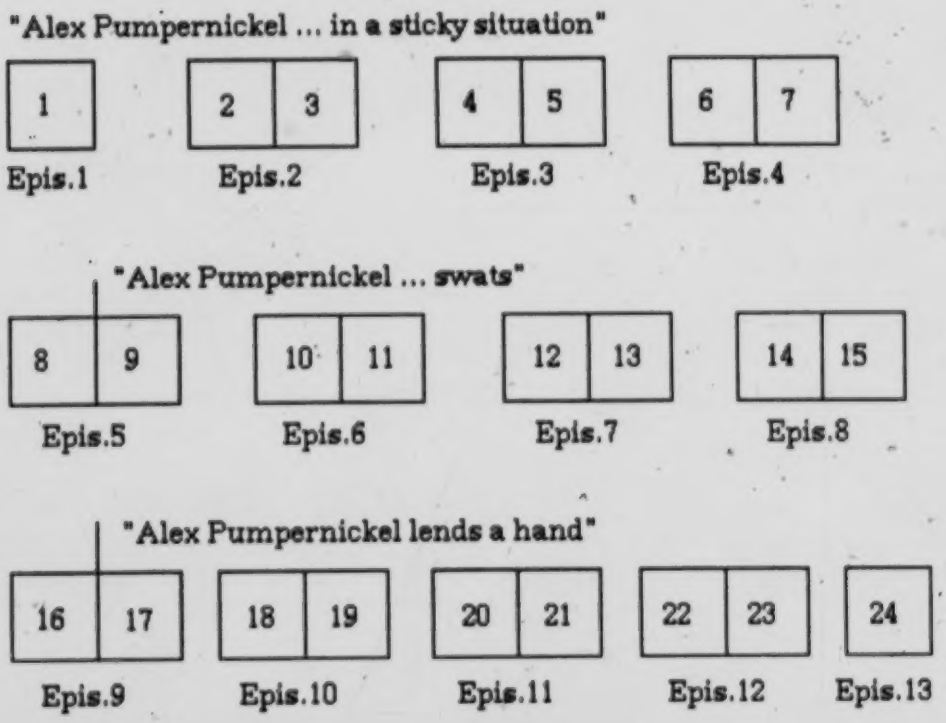

Figure 4.2. Odd Condition

The experiment was so designed because it was hoped that selection of anaphors by subjects assigned to each condition would vary in accord with the way episode boundaries were imposed if attentional and memorial activities actually determine speakers' anaphoric choice. The experiment was so designed also to see how subjects behave when natural story episode boundaries do not coincide with an imposed episode boundary, but involved within an artificial episode, i.e. in the Odd condition. Since an episode acts as a separate chunks/unit in memory, the question to be answered is will the natural episode boundary be strong enough in subjects' minds to override the artificial episode boundary, in which case we would expect them to use NPs to reinstate referents at that point, or will subjects simply ignore the natural episode boundary and react only to the currently imposed episode boundaries?

4.2.3. Subjects and procedures

Forty volunteers participated in the experiment. Twenty of them are native Chinese speakers who are all students at the University of Alberta

and who speak English as a second language (though they vary a great deal in English fluency). Fifteen of the Chinese participants speak Mandarin as their first language, the other five (from the South of China) speak fluent Mandarin and communicate with other Chinese mostly in Mandarin.

All twenty English participants are native English speakers. Thirteen of them are students at the University of Alberta, and the other seven are university graduates. All forty subjects are adults (over the age of twenty); ten of the Chinese speakers and seven of the English speakers are male.

English subjects were assigned randomly to the two English conditions, English Even and English Odd; Mandarin speakers randomly to the two Mandarin conditions, Mandarin Even and Mandarin Odd.

Sign-up sheets were filled up by subjects one week before the experiment so that subjects could arrange the time of participation themselves and would not feel time pressure during the experiment. All subjects showed up on time and performed the narrative tasks without any difficulty.

Each subject participated in the experiment individually. The subject was first given by the experimenter an instruction sheet (see Appendix B), which described briefly the two tasks to be performed by the subject. Since the instructions were written in English, the experimenter explained the instructions in Mandarin once more to each Chinese subject to ensure that it would be fully understood. The subject was also told that the experimenter would record and listen to his/her narration throughout the entire performance. The subject would therefore be fully aware of the presence of a listener. After that, the subject was asked if he/she had any questions concerning the general procedures. Once the subject was clear about the two tasks, the experiment began. During the experiment, the subject sat inside a soundproof booth, performing the narrative tasks, and the experimenter sat outside the booth, controlling the tape-recorder and listening to the subject through a pair of ear-phones. The subject and the experimenter could see each other through a large window between them.

The two narrative production tasks for each subject are: a on-line description task and a recall task. The on-line description task was performed first. The subject was asked to produce a story based on the pictures presented as they appeared on the screen. Each subject was told to take as much time as needed for each single or pair of pictures on a screen. But once finished with a screen, the subject should not play back to see it again. The first frame each subject saw consisted of a few sentences repeating the instruction once more. Then the subject pressed the mouse and started the narrative production. When all 12 or 13 frames were seen and described, the final frame stated: "That's all. Thank you!"

The subject was then asked to recall the entire story he/she had just described. He/she was instructed to retell as much as possible of the story without looking at the picture sequence again on the Macintosh screen. The purpose of the recall task was to examine the subject's anaphoric choice when there were no imposed episode boundaries. It was expected to accord with the hypothesis that NPs would be used less frequently in the recall task than in the on-line task since there were many fewer (only 2) episode

boundaries present in the recall task. In addition, since episodes act as separate units/chunks in memory, a subject would be able to realize such units/chunks in some way in their linguistic performance.

In the recall task, each of the Chinese groups -- Mandarin Even and Mandarin Odd -- was divided into two subgroups: five of each group performed the recall task in oral form and the other five performed the recall task in written form. The task was so divided for the following two reasons. First, Mandarin makes no gender distinction among third-person pronouns in oral form. All of the third-person singular pronouns, "he/she/it," have the same pronunciation of *ta*. Chinese subjects thus might have to use NPs to distinguish male characters from female characters in orally retelling the story, where the pronouns would do in English. However in written Mandarin, gender distinction is present for personal pronouns, and there are three different forms for "he," "she" and "it." By performing a written recall task, subjects would be able to use disambiguating pronouns instead of NPs. Thus we might distinguish disambiguating anaphors from those sensitive to episode boundary conditions by comparison of oral and written productions.

Secondly, according to the hypothesis proposed in the present study, the use of NPs and pronouns in discourse production is a function of cognitive processes, and of discourse and pragmatic information. Under certain circumstances, pronouns would not be employed even in cases where they could differentiate characters. It was expected, for example, that when dealing with two referents of different genders an English speaker would choose a pronoun to refer to one referent that had entered his focal attention, but would still use an NP to refer to the other referent already introduced in discourse if it was outside his focal attention even though the use of a pronoun here would not cause any ambiguity for the listener. In other words, differentiating genders of referents was not expected to be primary function of a pronoun in the present study. However with oral data only we would not be able to claim the same for Mandarin discourse production. The problem would be solved by comparing both of the oral and written recall tasks and if we obtained the results we expected the hypothesis would be much strengthened.

The entire performance of both the on-line and recall tasks took about fifteen to twenty minutes for each subject. Most subjects commented afterwards that the experiment was interesting and the tasks were easier than they expected them to be. No subject had seen the storybook before.

Two subjects were replaced after they had done the experiment. One is a Chinese male subject, who had an extremely brief description of the story. That is, he produced one clause or sentence per imposed episode on average, and skipped one episode entirely without describing it. The other is an English female subject, who had an extremely long description of the story. The on-line task alone took her thirty-five minutes to complete and much of her description was background information about the pictures such as how many trees were in Alex's backyard, how many windows were in the houses along the street, what kind of flower pots sat on the windowsill, etc. The data of these two subjects were discarded and two other subjects were recruited instead.

There was one problem involved in subjects' narrative production -- the gender of the central character of the story. Alex Pumpernickel is depicted by Krahn as a little boy with a ponytail sticking up on top of his head. The ponytail caused confusion to some of the subjects as to the gender. Ten of the English subjects (five in the Even condition and five in the Odd condition) and seven of the Mandarin subjects (four in the Even condition and three in the Odd condition) regarded Alex Pumpernickel as a girl. Thus of the three natural episodes in the story they described, two involved human characters of the same gender, i.e. two girls in "Alex Pumpernickel ... in a sticky situation," a girl and a woman in "Alex Pumpernickel lends a hand." This did not cause much problem for Mandarin subjects since the gender of the characters would not make any difference in subjects' anaphoric choice in their oral description and recall tasks. Some Mandarin subjects simply used a neutral term *zhe haizi/xiao hai* ("the child") instead in the second and third episodes. However for English subjects, such a gender difference might have caused them to use more NPs to differentiate characters within an episode boundary than would be expected with the original storyline. Fortunately for these ten English subjects, there was still one natural episode of the story in which the human characters differed in gender, i.e. a girl and a man in "Alex Pumpernickel ... swats", it is therefore still possible to see the difference in their anaphoric choice between this and the other two episodes.

4.3. Transcripts

Both the on-line and recall tasks performed by Mandarin and English subjects were recorded and then transcribed. Transcripts consisted of two parts: on-line description data and recall data. The data from the on-line tasks produced by subjects in both language groups were transcribed in terms of imposed episodes containing propositions. The data from the recall tasks were transcribed in terms of three natural episodes, and consisted of clauses or sentences.

As noted above, for the present experimental study, an imposed episode is operationally represented by a single picture or a pair of pictures presented to subjects on a Macintosh screen. Episode boundaries are imposed by video-cuts in the picture sequence. Propositions are defined (following Tomlin, 1987:461) as a semantic unit composed of a predicate plus its arguments for which a truth value can be determined. Propositions are used as the basic discourse measurement in the present study because a great many of psycholinguistic studies have given evidence that a proposition also represents a basic memory unit in human cognition and in discourse processing (Anderson and Bower, 1973, Clark and Clark, 1977, van Dijk and Kitsch, 1983). For the English data, a proposition is identified if an utterance is realized by a full clause or by a partial clause for which missing arguments are readily recoverable. Embedded complement clauses are not counted as separate propositions but as arguments of the

matrix clause in which they are embedded. Infinitive and participial clauses in adjunct relations in sentences are counted as independent propositions, but nominalizations and other complex phrasal constructions are not counted as independent propositions. An example is given in (1) below to illustrate how propositions were identified.

(1) Subject 8 (English Even)

EPIS	PROP	TEXT
*9	41	the little boy is now outside
9	42	and looks like he is on a corner
9	43	and he sees a lady
9	44	0 coming with (..) full of (..) bags full of groceries
10	45	the little boy asks
10	46	if he can help the woman
10	47	and the woman says yes
10	48	and 0 gives him some bags
10	49	to carry

This is an excerpt from the transcribed data of Subject #8 in the English Even condition. They are the ninth and tenth episodes of the on-line description, which consist of four and five propositions respectively (PROP 41-49). The asterisk put before the episode number denotes where there is a natural episode boundary.

The Mandarin data were transcribed by the experimenter phonetically. The on-line data were then also organized in terms of episodes consisting of propositions. For the identification of propositions in Mandarin data, the experimenter tried to use the same standard as employed in English data where applicable. Since Mandarin is so different in structure from English, it is not possible to identify propositions for the both languages in the same way. Generally propositions are realized in Mandarin data as clauses with a predicate plus its arguments. For example,

(2) na nuren hen gaoxin, 0 gei ta yige koudai.
that woman very happy give him a bag
The woman is very happy and gives him a bag.

There are two propositions in (2), the first is a full clause with an adjectival predicate and the second is a partial clause with a zero anaphor subject, which is readily recoverable. Complex clauses like verb-complement construction and pivotal construction are considered as single propositions. For example,

(3) wo rang ta lai
I ask him come
I asked him to come.

Sentence (3), a pivotal structure, is considered as one proposition. On the other hand, V-V series expressing sequence of events are considered as separate propositions. For example,

(4) ta zhao le gen daizi zha koudai.
he find PERF a string tie bag
he found a string to tie a bag.

Example (5) below is an excerpt from a Mandarin transcript, which illustrates the way propositions in Mandarin data were identified and transcribed.

(5) Subject #2 (Mandarin Odd)

EPIS	PROP	TEXT
5	17	xiao nanhai he xiao nuhai ba qiu na-dao ...(em..) little boy and little girl OM ball take-to fangjian waimian yihou room outside after After the boy and the girl take the ball outside the house
5	18	0 jiu tian naxie [ ] dongxi just lick those stuff
5	19	0 qiu-shang zhan de ball-on stick RP (they) lick the stuff sticking to the ball
*5	20	zhe xiao nanhai houlai kanjian yige cangying this little boy later see a fly later the boy sees a fly
5	21	0 jiu (..) jiu zhan-zai yizi-shang just just stand-at chair-on
5	22	0 da cangying swat fly (he) stands on a chair to swats the fly

There was also English word-for-word translation for each proposition, and finally an English gloss was added.

Two native English speakers and two native Mandarin speakers were asked to identify propositions in originally recorded English and Mandarin transcripts so as to obtain an independent judgement for propositions defined in the present study. Their results show very little variation with those of the experimenter.

All linguistic information in the recordings was also recorded in the transcripts, including filled pauses such as "uh," "um," "aa," "em," etc, unfilled pauses (i.e.(..)), false starts, repairs, and comments by the subject. The positions of the zero anaphora were marked by 0 explicitly for both English and Mandarin which are shown in the above examples. As discussed previously in Chapter Three, only surface zero subjects were identified in English; other PROs such as empty categories in infinitive

clauses and WH-clauses were not counted for the present experimental data. For example,

(6) John is likely to win.
(7) John is easy to please.
(8) I wonder who saw Mary.
(9) I wonder who you will see.

No zero anaphora would be counted in sentences such as (6)-(9) above. As for the Mandarin data, zero anaphora were identified by examining whether there were any arguments missing in a proposition. For example,

(10) xiao nanhia meiyou dazhao 0
little boy have-not hit
0 feichang jusangdi cong wu-li zou chulai
very depressed from room-in walk out
The boy didn't kill (the fly) and (he) walks out of the house, very depressed

The example given in (10) illustrates how zero anaphora were identified, and the experimenter was consistent with the identification throughout the entire data processing.

Relative clauses in the data were counted as separate propositions. Square brackets were used to denote the original position of a relative clause, whose content appeared in the next proposition. For example,

(11) Subject #8 (English Odd)

EPIS	PROP	TEXT
4	24	the boy stands on a stool
4	25	so that he can see into the pot [ ]
4	26	which is on a stove

(12) Subject #2 (Mandarin Even)

EPIS	PROP	TEXT
*9	38	xiao hai cong jia-li chulai little kid from home-in come-out
9	39	0 yingmian kanjian yige [ ] nuren head-on see a woman
9	40	shuang-shuo ti man dongxi de both-hands carry full thing RP

The little kid walks out of the house and meets head-on a woman whose hands are full of things.

Finally the recall data were transcribed in terms of three natural episodes consisting of clauses or sentences. English data were transcribed straightforwardly with all linguistic information mentioned above. Example (13) below is an excerpt from the transcript of a recall task which illustrates the way the English recall data were transcribed.

(13) Subject #2 (English Even)

> In the last group of pictures, the boy was walking down the street, 0 turned the corner and 0 saw a lady 0 approaching him with a couple of bags in hand. He then asked the lady to help (..) he then asked the lady if he could help her carry the bags. She agreed and then the boy helped her carry the bags. He let the woman go ahead and 0 stopped at the corner of the house to look into the bag. He found out there was (uh) a lobster inside. And after he got bitten by the lobster he put it back into the bag, and 0 caught up to the woman. And he is looking rather embarrassed.

Mandarin oral and written recall data (in standard Chinese characters) were transcribed by the experimenter phonetically. They were then translated into English with many of the zero anaphora recovered from the context and expressed as pronouns since zero anaphora appearing in the corresponding English sentences would be grammatical errors. The recovered pronoun was put in parenthesis so as to show that the position was originally occupied by a zero anaphor in the Mandarin data. For example,

(14) Subject #8 (Written Recall) (Mandarin Even)

gushi 3: yige nanhai zai jie-shang xianguang. 0 kanjian yige lao furen
a boy at street-on loiter see a old woman
0 tizhe henduo kaizi. xianran 0 shi mai dongxi huilai. .....
carry many bag obviously is buy thing back

Story 3: A boy is loitering on the street. (He) sees an old woman 0 carrying many bags. Obviously (she) just came back from shopping. ...

All data were assessed twice and the transcripts double checked before the measurements were applied to the tokens. The Mandarin transcripts were also re-checked by another native Mandarin speaker; the words, phrases or clauses unclear to the experimenter in the English data were listened to and confirmed by a native English speaker.

Sample transcripts of Mandarin and English on-line and recall data can be found in Appendix C.

After data collected from both English and Mandarin speakers had been transcribed, several measurements were applied, which are described in the following section.

4.4. Measurements of Discourse Production

The experimental data are investigated in terms of discourse density, proportion of hits and misses, proportion of human vs. nonhuman tokens against each anaphoric category (i.e. NPs, lexical pronouns and zero anaphora), and proportion of central vs. non-central character tokens against each anaphoric category. Those terms are measured as follows:

Discourse density is measured by calculating the average number of propositions produced for each imposed episode by subjects in each experimental condition. This measurement was only applied to the on-line description task since propositions were not counted in the recall task.

The next few measurements were applied to all of the tokens, defined as follows. In the experimental data, the tokens were tallied by counting the three anaphoric devices occurring in both on-line and recall data. All pronouns and zero anaphora were counted, but NPs were counted as tokens only if their referents would be referred to again, either in the form of a pronoun/zero anaphor or in the form of an NP. For example, in describing the second natural episode "Alex Pumpernickel ... swats," a subject usually mentioned several inanimate objects in the pictures along with the human and non-human characters, such as "the chair the boy stands on to swat the fly," "the newspapers the boy messes around to look for the fly," "the couch the man is lying on," etc. The NP of "the chair," "the newspapers," or "the couch" was counted as a token only if its referent of the same chair, same newspapers, or the same couch was mentioned again in the subsequent discourse by either a pronoun (e.g. "it/they"), zero anaphora, or another NP ("the chair," "the newspapers," or "the couch"). The tokens were so tallied because the present study focuses on how entities introduced in discourse are referred to again at a later point.

The tokens were then subjected to another three measurements: the proportion of hits and misses, the factor of pragmatic status and anaphoric choice, and the factor of centrality and anaphoric choice.

Humanness and anaphoric choice were assessed by counting tokens of human, non-human, and inanimate referents against anaphoric categories in order to see if the factor of humanness affects in any way the speaker's anaphoric choice. This is calculated by computing the percentages of NPs, pronouns and zero anaphora respectively for the total number of tokens of human, nonhuman, and inanimate referents respectively. That is, of all the tokens for each of the three categories, what is the percentage of NPs and what is the percentage of pronominals?

Centrality and anaphoric choice is calculated by computing the percentages of NPs, pronouns and zero anaphora to the total number of tokens of central versus non-central human referents, i.e., of all tokens of central/non-central referents, what is the percentages of NPs and what is the percentage of pronominals? Data were so collected in order to see if the factor of centrality affects in any way the speaker's anaphoric choice.

According to the hypothesis, NPs would be used for the first mentions of referents, for the reinstatement of reference at episode boundaries, or for ambiguity resolution within episodes; pronominals would be used within episodes to maintain references. In the present study,

tokens that are consistent with the hypothesis are counted as hits and tokens that run counter to the hypothesis are counted as misses. For this experiment, data were collected by calculating the percentages of hits and misses to overall tokens only in the on-line description task.

Finally it should be mentioned that NPs which were counted as ambiguity resolution within an imposed episode were actually dealt with in a very strict way. An NP was counted as a case of ambiguity resolution (i.e. a hit) only if the contextual and pragmatic information could not help disambiguate the referents when a pronoun was used in such a case. Otherwise it was still counted as a miss within an imposed episode. For example,

(15) Subject #6 (English Even)

EPIS	PROP	TEXT
10	57	the little girl is pointing at the bags [ ]
10	58	that the woman is carrying
10	59	and the woman stops
10	60	to talk with her
10	61	and then the little girl is carrying one of the bags [ ]
10	62	the woman is carrying
10	63	so the woman is carrying only one bag
10	64	and the little girl is helping her
10	65	to carry the other
10	66	and the woman looks back
10	67	and 0 smiles at the little girl
10	68	the little girl is happy
10	69	that she could help

In the above excerpt, "the woman" in (10:59), (10:62) and (10:66) is counted respectively as a hit, while "the girl" in (10:61), (10:64), (10:67) and (10:68) is counted respectively as a miss.

4.5. Results

4.5.1. Discourse density measurement

The first measurement applied to the data was the measurement of discourse density, which is shown in Table 4.1. (next page).

	Prop. Per Subj.	Prop. Per Epis	Indiv. Range	Standard Deviation	T-test	T-test
Even Eng.	78.5	6.54	56 - 105	15.04	t=0.54	t=1.57
Odd	82.8	6.37	55 - 107	20.04		
Even Man.	72.7	6.06	54 - 95	15.50	t= 0.057	
Odd	72.3	5.56	56 - 103	15.89		

Table 4.1. Discourse Density

The first column is the average propositions produced by each subject in the on-line task, the second column is the average propositions produced in each imposed episode, the third column is the range of the individual proposition production for each of the conditions, the fourth column is the standard deviation for the individual proposition range and the last two columns are the t-tests between the Even and Odd conditions, between the English and Mandarin groups, and their statistical significance* . It is interesting to see that subjects in each of the four conditions produced almost the same density of information when propositions are averaged per imposed episode. There is no statistically significant difference between the English group and the Mandarin group as well as between the Even and Odd conditions in number of propositions produced for the on-line task although propositions produced by Mandarin subjects were slightly fewer than those produced by English subjects (average 5.81 per episode for Mandarin subjects and 6.46 per episode for English subjects).

The measurement of discourse density is important because it shows that not only subjects in each of the two experimental conditions, but also subjects in each of the two different languages are responding to the discourse production task in very comparable ways. It provides good grounding for the comparisons of various other measurements between the two languages as well as between the two conditions of the same language.

4.5.2. Overall Tokens

There are overall 8262 tokens produced by the forty English and Mandarin subjects in the two narrative tasks. Table 4.2. (next page) shows the three types of anaphors produced by subjects in each of the four conditions for the two tasks.

Group	English				Mandarin				TOTAL
Condition	Even		Odd		Even		Odd		
Task	OL	RC	OL	RC	OL	RC	OL	RC	
NP	669	513	687	502	582	547	623	549	4672
PRON	372	275	446	334	132	117	104	96	1876
ZERO	137	126	165	101	335	282	326	242	1714
Subtotal	1178	914	1298	937	1049	946	1053	887	8262
TOTAL	4237				3935				

Table 4.2. Distribution of Tokens by Anaphor Type and Condition

The figures in the rightmost column of Table 4.2. show that in general the total number of NPs were 23% more than the total number of pronominals (pronoun plus zero anaphora), and the total number of pronouns is about the same as the total number of zero anaphora for the overall tokens. T-tests (independent samples) were applied to see the overall production of anaphors between subjects in the Even and Odd conditions within each language group, and between subjects of each language group. The results are shown in Table 4.3. (next page).

Table 4.3. shows that for both the English and Mandarin groups, there are not only no statistically significant differences between subjects in each of the experimental condition in producing either NPs or pronominals, but also no such differences between subjects in each language group. Subjects' overall performance was quite consistent across the languages as well as the experimental conditions. The results again demonstrate that subjects of different languages and of different conditions are responding, in comparable ways, to the anaphoric production in discourse. This provides good and solid grounding for the comparisons of reference management between the two languages in the present study, and also provides same evidence of universality in reference management in languages in general.

Let us now examine further the anaphoric production between and within each of the experimental conditions in each language group. For both the English group and the Mandarin group, NPs in on-line (OL) task are a little more than those in recall (RC) task. This is what we expected because in line with the hypothesis subjects were constrained in the on-line task by the imposed episode boundaries where they had to use NPs to reinstate reference, while in the recall task where no imposed episode boundaries were present, subjects produced NPs less frequently. Table 4.4. (Page 69) shows the results of t-tests (correlated samples) that were applied

to the three anaphoric types produced by subjects in each of the experimental condition.

A. English Even versus Odd:

Anaphor	NP		PRON		ZERO	
Conditions	Even	Odd	Even	Odd	Even	Odd
Tokens	1182	1189	647	780	263	266
Mean	118.20	118.90	64.70	78.00	26.30	26.60
SD	19.96	25.97	28.64	34.38	6.37	8.53
T-tests	0.064		0.89		0.085	

B. Mandarin Even versus Odd:

Anaphor	NP		PRON		ZERO	
Condition	Even	Odd	Even	Odd	Even	Odd
Tokens	1129	1172	249	200	617	568
Mean	112.90	117.20	24.90	20.00	61.70	56.80
SD	30.73	21.57	9.13	7.40	5.85	13.83
T-tests	0.34		1.25		0.98	

C. English versus Mandarin Group:

Anaphor	NP		PRON	
Language Group	English	Mandarin	English	Mandarin
Tokens	2371	2301	1956	1634
Mean	118.55	115.05	97.80	81.70
SD	23.17	26.64	34.94	15.18
T-tests	0.43		1.86	

Table 4.3. Test of Significance for Between Condition and Between Language Differences

A. English Even:

Anaphor	NP		PRON		ZERO	
Task	OL	RC	OL	RC	OL	RC
Tokens	669	513	372	275	137	126
Mean	66.90	51.30	37.20	27.50	13.70	12.60
SD	13.55	9.68	16.92	12.37	3.82	3.75
T-tests	3.80*		3.81*		0.81	

B. English Odd:

Anaphor	NP		PRON		ZERO	
Task	OL	RC	OL	RC	OL	RC
Tokens	687	502	446	334	165	101
Mean	68.70	50.20	44.60	33.40	16.50	10.10
SD	14.42	14.46	23.04	13.41	5.10	5.86
T-tests	4.39*		3.75*		2.78*	

C. Mandarin Even:

Anaphor	NP		PRON		ZERO	
Task	OL	RC	OL	RC	OL	RC
Tokens	582	547	132	117	335	282
Mean	58.20	54.70	13.20	11.70	33.50	28.20
SD	17.79	13.59	5.95	4.61	5.24	4.51
T-tests	1.38		0.82		2.03	

D. Mandarin Odd:

Anaphor	NP		PRON		ZERO	
Task	OL	RC	OL	RC	OL	RC
Tokens	623	549	104	96	326	242
Mean	62.30	54.90	10.40	9.60	32.60	24.20
SD	12.35	10.55	4.13	3.56	10.83	4.69
T-tests	2.89*		1.12		2.91*	

Table 4.4. Test of Significance for Within Group Differences

Table 4.4. shows that for each condition, the difference between NPs used in the on-line and the recall tasks reaches the significance level of 0.05 except for the Mandarin Even condition where NPs used in the on-line task are still 35 more than those used in the recall task. It is generally the same case for the pronominals used in each condition within and across languages: pronouns and zero anaphora used in each on-line task are more than those used in each recall task although some reach the statistically significant level and some do not. The reason is obvious: in the on-line task, subjects were specifically required to describe every picture presented on the screen, while in the recall task subjects retold the story from memory. The on-line tasks therefore induced more propositions and clauses from subjects than did the recall task, and consequently pronouns and zero anaphora used in the on-line task were more than those used in the recall task.

Moreover for the on-line task within each language group, the number of NPs produced in the Odd condition is greater than the number produced in the Even condition (687 vs. 669 in the English group, and 623 vs. 582 in the Mandarin group). This is also expected because of the experimental design: there were 13 imposed episode boundaries in the Odd condition and 12 in the Even condition, and according to our hypothesis this one more episode boundary in the Odd condition would induce each subject to use at least one more NP, which is exactly what happened. Since there is only one more imposed episode boundary in the Odd condition than in the Even condition, the difference between NPs in the two conditions does not reach the level of significance ($t = 0.27$ and $t = 0.57$ respectively).

The results shown in the above tables indicate that there are general patterns across the two languages in using the two types of anaphors, NPs and pronominals, in narrative production. However, differences between English and Mandarin groups in pronominal production are also observed from Table 4.1 (Page 66) Lexical pronouns were used very frequently by English subjects: for each of the four English subgroups, pronouns are about 250% more than zero anaphora (1427 vs. 529). The opposite is observed with the Mandarin group. Zero anaphora were used very extensively by subjects: for each of the four Mandarin subgroups, zero anaphora are about 250% more than pronouns (449 vs. 1185).

This is again expected because of the language specific characteristics. As discussed previously in Chapter Three, zero anaphora in English are syntactically conditioned and lexical pronouns are some of the most frequently occurring lexical units (Kucera & Francis, 1967). In Mandarin zero anaphora is more often the rule and lexical pronouns the exception; Li & Thompson (1979) point out that, in fact, an English text would require ten times the number of pronouns as its Chinese translation. The differential use of pronouns and zero anaphora in Mandarin discourse will be discussed in detail in Chapter Six.

4.5.3. Frequency distribution of anaphors

The overall set of referents can further be differentiated in at least two ways. The first way concerns the type and the number of referents mentioned by subjects and the relative frequencies of mention of those

referents. The second way concerns the factor of pragmatic information in discourse such as the "humanness" and "centrality" of the referents, and its influence over speakers' anaphoric choice. These two important aspects of distinguishing referents are presented in the following sections.

4.5.3.1. Overall distribution of referents

Table 4.2. showed that there are overall 8262 referents tokens found in the experimental data. It should be born in mind that an NP was counted as a referent token if and only if its referent was mentioned at least twice by a subject in either one of the two tasks. Table 4.5. below shows the frequency distribution of all tokens over human, non-human and inanimate referents in each of the four conditions.

	Human		Non-Hum	Inanimate	TOTAL
	Cent	Non-Cent			
English Even	875	412	168	637	2092
English Odd	960	447	133	695	2235
Mandarin Even	893	333	197	572	1995
Mandarin Odd	860	365	160	555	1940
TOTAL	3588	1557	658	2459	8262

Table 4.5. Frequency Distribution of Referent Types by Condition

The referents are grouped in Table 4.5. under three sub-categories of human, non-human and inanimate. The human referents are "the child" (a boy or a girl), "the girl," "the man," and "the woman;" the non-human referents are "the fly" and "the lobster;" and the most frequently mentioned inanimate referents are "the ball," "the newspapers" and "the bag." These nine referents were frequently mentioned by every subject in the two narrative production tasks. Other inanimate referents that were mentioned at least twice by subjects for each task were also included in the inanimate sub-category.

Table 4.5. shows strikingly similar results for the frequency distribution of the tokens over different types of referents (human central, human non-central, non-human, and inanimate) across the four different groups. Once again, the results show the general pattern of narrative production across languages. Based on the results shown in Table 4.5, a hierarchy can be drawn of frequency of mentions by subjects over the three types of referents in the story:

Human >> Inanimate >> Non-human

4.5.3.2. "Humanness" and "centrality" of the referents

The second respect in which the referents can be distinguished is by grouping them in terms of "humanness" and "centrality" in relation to the frequency distribution of each type of anaphors. The purpose of such grouping is to see if and how pragmatic information in discourse influences speakers' anaphoric choice. The frequency distribution of anaphors over the four types of referents are presented below in Table 4.6.-4.9. (Pages 72-75), which report the results of each of the four condition groups respectively. There are three parts for each table: Part A is the on-line results, Part B the recall results, and Part C the average results of both tasks.

A. On-line Description:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	152	154	66	297	669
PRON	258	53	10	51	372
ZERO	96	34	3	4	137
TOTAL	506	241	79	352	1178
% NP	30.04	63.90	83.54	84.38	56.79
% PRON	50.99	21.99	12.66	14.49	31.58
% ZERO	18.97	14.11	3.80	1.13	11.63

B. Recall:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	96	102	73	242	513
PRON	182	39	14	40	275
ZERO	91	30	2	3	126
TOTAL	369	171	89	285	914
% NP	26.02	59.65	82.02	84.91	56.13
% PRON	49.32	22.81	15.73	14.04	30.09
% ZERO	24.66	17.54	2.25	1.05	13.78

C. Overall Average:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	248	256	139	539	1182
PRON	440	92	24	91	647
ZERO	187	64	5	7	263
TOTAL	875	412	168	637	2092
% NP	28.34	62.14	82.74	84.62	56.50
% PRON	50.29	22.33	14.29	14.29	30.93
% ZERO	21.37	15.53	2.97	1.09	12.57

Table 4.6. Frequency Distribution of Anaphors by Humanness/Centrality (English Even)

A. On-line Description:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	164	158	51	314	687
PRON	295	73	9	69	446
ZERO	114	38	5	8	165
TOTAL	573	269	65	391	1298
% NP	28.66	58.74	78.46	80.31	52.19
% PRON	51.62	27.14	13.85	17.65	34.90
% ZERO	19.72	14.12	7.69	2.04	12.91

B. Recall:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	97	105	54	246	502
PRON	210	59	10	55	334
ZERO	80	14	4	3	101
TOTAL	387	178	68	304	937
% NP	25.06	58.99	79.41	80.92	53.58
% PRON	54.26	33.15	14.71	18.09	35.64
% ZERO	20.68	7.86	5.88	0.99	10.78

C. Overall Average:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	261	263	105	560	1169
PRON	505	132	19	124	780
ZERO	194	52	9	11	266
TOTAL	960	447	133	695	2235
% NP	27.19	58.84	78.95	80.58	52.78
% PRON	52.60	29.53	14.28	17.84	35.21
% ZERO	20.21	11.63	6.77	1.58	12.01

Table 4.7. Frequency Distribution of Anaphors by Humanness/Centrality (English Odd)

A. On-line Description:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	130	128	76	248	582
PRON	119	8	3	2	132
ZERO	229	45	24	37	335
TOTAL	478	181	103	287	1049
% NP	27.20	70.72	73.79	86.41	55.48
% PRON	24.90	4.42	2.91	0.70	12.58
% ZERO	47.90	24.86	23.30	12.89	31.94

B. Recall:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	105	109	70	263	547
PRON	113	2	0	2	117
ZERO	197	41	24	20	282
TOTAL	415	152	94	285	946
% NP	25.30	71.71	74.47	92.28	57.82
% PRON	27.23	1.32	0.00	0.70	12.37
% ZERO	47.47	26.97	25.53	7.02	29.81

C. Overall Average:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	235	237	146	511	1129
PRON	232	10	3	4	249
ZERO	426	86	48	57	617
TOTAL	893	333	197	572	1995
% NP	26.32	71.17	74.11	89.34	56.59
% PRON	25.98	3.00	1.52	0.70	12.48
% ZERO	47.70	25.83	24.37	9.96	30.93

Table 4.8. Frequency Distribution of Anaphors by Humanness/Centrality (Mandarin Even)

A. On-line Description:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	162	145	65	251	623
PRON	94	9	0	1	104
ZERO	220	49	20	37	326
TOTAL	476	203	85	289	1053
% NP	34.04	71.43	76.47	86.65	59.61
% PRON	19.74	4.43	0.00	0.35	9.88
% ZERO	46.22	24.14	23.53	12.80	30.96

B. Recall:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	127	122	55	245	549
PRON	87	6	2	1	96
ZERO	170	34	18	20	242
TOTAL	384	162	75	266	887
% NP	33.07	75.31	73.33	92.11	61.89
% PRON	22.66	3.70	2.67	0.38	10.82
% ZERO	44.27	20.99	24.00	7.51	27.29

C. Overall Average:

	Hum-C	Hum-NC	Non-Hum	Inanimate	TOTAL
NP	289	267	120	496	1172
PRON	181	15	2	2	200
ZERO	390	83	38	57	568
TOTAL	860	365	160	555	1940
% NP	33.60	73.15	75.00	89.37	60.41
% PRON	21.05	4.11	1.25	0.36	10.31
% ZERO	45.35	22.74	23.75	10.27	29.28

Table 4.9. Frequency Distribution of Anaphors by Humanness/Centrality (Mandarin Odd)

The frequency distribution of the three types of anaphors is presented in the above tables in terms of number of tokens for each type of referent. It is also presented in terms of proportions of each type of anaphor for each type of referent. For example, in Table 4.6 (Page 72), the second column of Part A headed Hum-C (human central referent) shows that of 506 tokens for human central referents, 152 are NPs (30.04% of the total human central tokens), 258 are pronouns (50.99% of the total) and 96 are zero anaphora (18.97% of the total).

The tables reveal several interesting results. First of all, the human

referents as a whole differ from the non-human and inanimate ones with respect to the frequency distributions in question. The human referents are much more frequently referred to by pronominals than are non-human (including inanimate) referents by all four groups, and the results across groups are very similar: 61% vs. 16% for the English Even condition, 63% vs. 20% for the English Odd condition, 61% vs. 19% for the Mandarin Even condition, and 55% vs. 18% for the Mandarin Odd condition. In other words, while the non-human referents were most often referred to by NPs (more marking material), the human ones were least reinstated by the explicit use of more marking material. On the other hand, the various human referents in the story were by no means treated equivalently by the subjects. The factor of centrality makes a huge difference in subjects' anaphoric choice for human referents. The percentages of inexplicit anaphors used for human central and non-central referents are 70% vs. 30% on average across conditions and languages. The huge differences in speakers' anaphoric choice between the human referents are striking, though not surprising. Though humans are more generally the subjects of narrative, human central referents are more likely to be at the heart of the story than non-central ones, and they tend to be focused on and talked about more about throughout the narrative (see Table 4.5, Page 71). Consequently, human central referents enter and remain in speakers' focal attention much more frequently, and they are more often referred to by inexplicit anaphors than their non-central counterparts.

Secondly, although referents other than the human central ones are much more often referred to by explicit rather than inexplicit anaphors in all four subgroups, cases are different between the two languages: for the two English groups, the percentages of NPs for human non-central referents are considerably lower than those used in the two Mandarin groups: about 59% vs. 72% on average; the percentages of NPs used for non-human referents are higher than those used in the two Mandarin groups: about 80% vs. 75% on average; and NPs used for inanimate referents are lower than those used in the two Mandarin groups: about 82% vs. 89% on average. The differences between the two languages lie in the fact that Mandarin subjects had to use NPs to differentiate human referents in cases where English subjects could use pronouns. This resulted in a higher rate of NPs used for human non-central referents in the Mandarin than in the English groups. On the other hand, inanimate referents were rarely referred to by pronominals in Mandarin while they (e.g. "the ball" in the first episode) were relatively more often referred to by pronominals in English. This resulted in a higher rate of NPs used for inanimate referents in the Mandarin than in the English groups. As for the non-human referents, the proportion of NPs used in English groups is similar to that for the inanimate referents: 81% and 83% on average, but the proportion of NPs used in the Mandarin groups is lower than that for the inanimate referents: 75% and 89% on average. The difference in question is caused by language specific coding devices: although Mandarin lexical pronouns are rarely used to code referents other than humans, Mandarin zero anaphora has a much wider range of use, and very often codes both human and non-human referents, although less often inanimates. Consequently, for the

Mandarin groups the rates of NPs used for the non-human referents are lower than those used for the inanimate ones.

The results from Tables 4.6 to 4.9 (Pages 72-75)are also arc-sine-square transformed and then analyzed using ANOVA. A five-way (Language X Condition X Task X Form X Animacy) interaction analysis was performed, and the results are shown in Table 4.10 below.

	Source	Sum of Squares	DF	Mean Square	F
1.	Mean	127.10	1	127.10	xxxxx
2.	Lang	0.0368	1	0.0368	4.00
3.	Cond	0.0001	1	0.0001	0.11
4.	Task	0.0008	1	0.0008	0.09
5.	Form	26.4740	2	13.2370	1437.34*
6.	Atten	0.2286	3	0.0762	8.27
7.	LC	0.0017	1	0.0017	0.18
8.	LT	0.0004	1	0.0004	0.01
9.	CT	0.0033	1	0.0033	0.35
10.	LF	5.1840	2	2.5920	281.45*
11.	CF	0.0043	2	0.0022	0.23
12.	TF	0.0116	2	0.0058	0.63
13.	LA	0.0163	3	0.0054	0.59
14.	CA	0.0039	3	0.0013	0.14
15.	TA	0.0003	3	0.0001	0.01
16.	FA	13.2620	6	2.2103	240.00*
17.	LCT	0.0092	1	0.0092	1.00
18.	LCF	0.0731	2	0.0365	3.97
19.	LTF	0.0162	2	0.0081	0.88
20.	CTF	0.0463	2	0.0232	2.52
21.	LCA	0.0080	3	0.0027	0.29
22.	LTA	0.0008	3	0.0003	0.03
23.	CTA	0.0132	3	0.0044	0.48
24.	LFA	0.3309	6	0.0551	6.00
25.	CFA	0.1020	6	0.0170	1.85
26.	TFA	0.0540	6	0.0090	1.00
27.	LCTF	0.0141	2	0.0071	0.77
28.	LCTA	0.0052	3	0.0017	0.19
29.	LCFA	0.0415	6	0.0069	0.75
30.	LTFA	0.0478	6	0.0080	0.87
31.	CTFA	0.0322	6	0.0054	0.58
32.	LCTFA	0.0553	6	0.0092	

Table 4.10. Five-way ANOVA Results

Table 4.10 shows two significant two-order interactions: LF (language X Form; p , 0.01) and FA (Form X Animacy; $p < 0.01$). No other significant interaction was found in the analysis. The two interactions are presented in Figures 4.3. and 4.4. (Pages 77-79) based on the cell and marginal means.

Language X Form Interaction ($p < 0.01$)

	NP	Pron	Zero
English	1.85	1.07	0.59
Mandarin	1.93	0.41	1.05

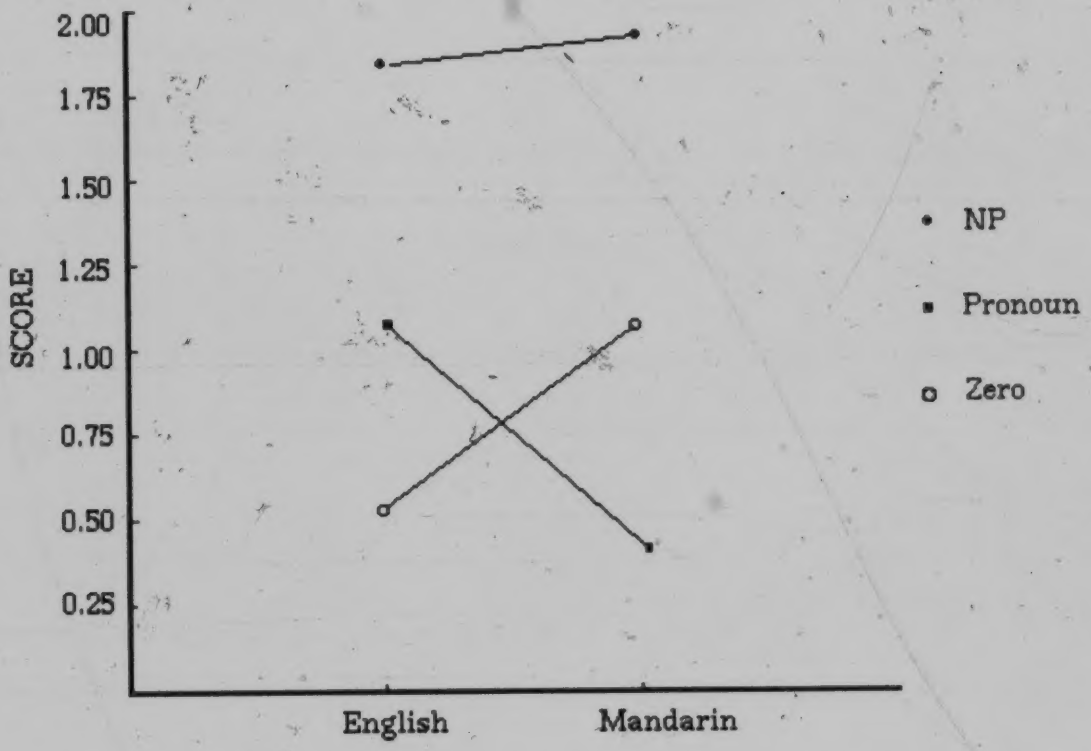

Figure 4.3. Language X Form Interaction

Form X Animacy Interaction ($p < 0.01$)

	Human-C	Human-NC	Nonhuman	Inanimate
NP	1.13	1.90	2.16	2.38
Pron	1.31	0.71	0.48	0.46
Zero	1.23	0.89	0.73	0.43

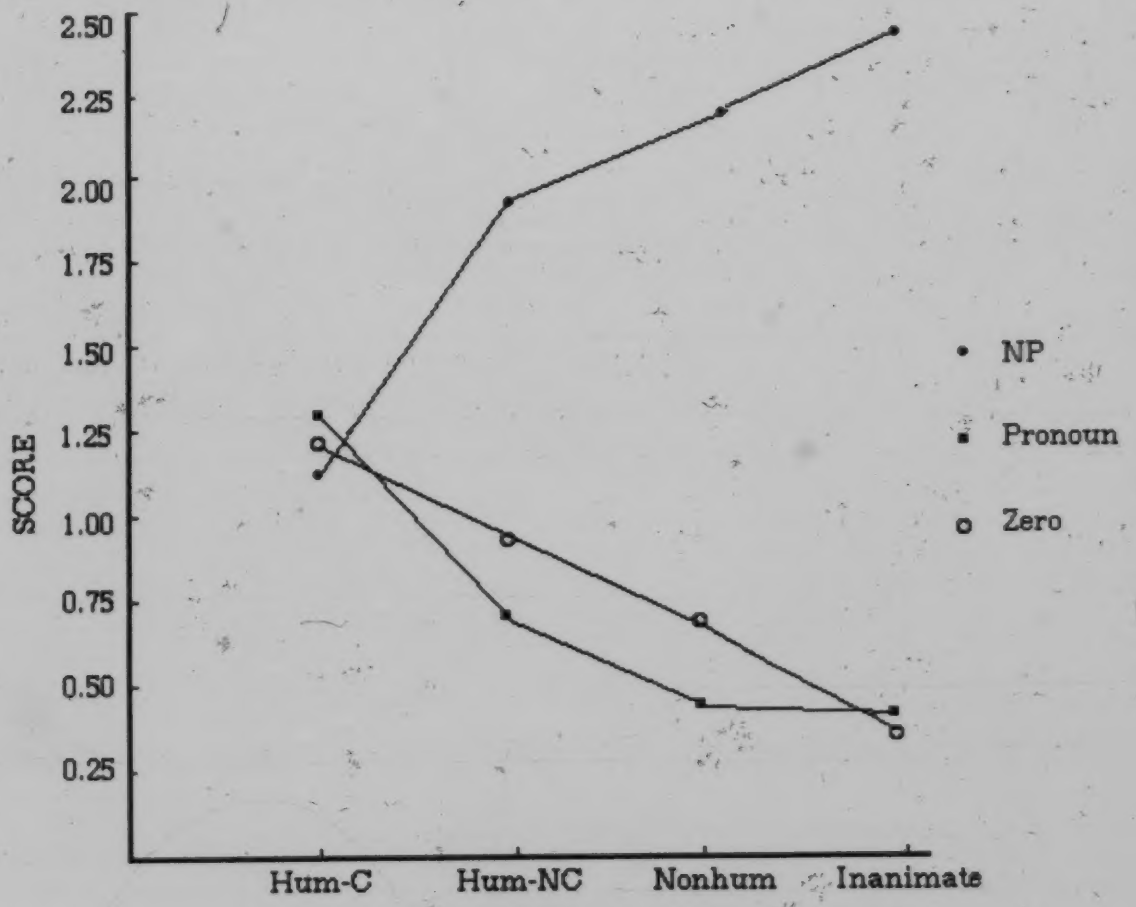

Figure 4.4. Form X Animacy Interaction

Based on the FA interaction from Figure 4.4, the following hierarchies can be proposed for anaphors and animacy factors, which illustrate the general pattern of anaphoric options between NPs and pronominals in narrative production across languages.

NP: Human(Cent) << Human(Non-Cent) < Non-human < Inanimate
PRON: Human(Cent) >> Human(Non-Cent) > Non-human > Inanimate

In other words, human central referents are coded much more frequently

in inexplicit anaphors, or using less marking materials, than any other kind of referent; human non-central referents are coded more often by inexplicit anaphors than non-human/inanimate referents; and inanimate referents are the least referred to by inexplicit anaphors. The hierarchies support the hypothesis of the present study in terms of centrality and attention: the more central a referent, the more it will be attended to, the longer it will stay in focus, and consequently the more frequent the inexplicit (or attenuated) anaphoric device will be used to code and identify it.

4.5.4. Episode Boundary Results

The episode boundary results are very crucial to the hypothesis proposed in the present study. If a speaker's anaphoric choice is tied to cognitive process of memory and attention as reflected in the speaker's episodic organization in his discourse production, then subjects in each of the experimental conditions would be expected to have the same performance behavior across the two languages. This is exactly what has been found in the experimental study. In this section, results of episode boundary effect are presented in terms of the on-line and the recall tasks.

4.5.4.1. Psychological reality of episodes

As discussed at the beginning of the present chapter, episodes exist as separate memory units. The results obtained from the recall task in all four groups give evidence that episodes exist as chunks in narrative memory.

As is described in Section 4.2.3, subjects in each of the four groups performed the recall task immediately after the on-line description task. Although there was no written clue in either of the conditions that there were three episodes in the story, 34 out of 40 subjects (85%) recognized the three natural episodes and mentioned the fact overtly. Overall, the English groups had the same rate of episode recognition as the Mandarin groups: 85% (17 out of 20) across the languages. However both Even conditions had higher rates of episode recognition than both Odd conditions: 90% (9 out of 10) for the English Even and 100% for the Mandarin Even; 80% (8 out of 10) for the English Odd and 70% (7 out of 10) for the Mandarin Odd. Each one of these "recognizing" 34 subjects overtly mentioned that the story consisted three episodes: they used the phrases such as "three short stories," "three sections," "three parts," "three episodes," "three groups/sets of pictures," etc. Such mentions generally occurred at the beginning of the recall, and many subjects again started each of the three episodes with "the first story, ...," "the second story,...," and "the third story, ..."

More interestingly, some subjects' recall show the specific monitoring role macropropositions play in discourse processing. 5 out the 34 subjects who overtly mentioned the three natural episodes then failed to remember the content of all the three during their recall. Of the five subjects, 2 were in the English groups (1 in Even and 1 in Odd), and 3 in the Mandarin groups (1 in Even and 2 in Odd). The one episode they tended to

forget was always the middle one ("Alex Pumpernickel ... swats"). The five subjects remembered and recalled the first and the third episodes first, and then they commented that they remembered there was one more episode, but could not tell what it was. The way they finally recalled the second episode is also of great significance: each one of them recalled the paragraph level theme, or macroproposition first, and then the whole episode came flowing out. The exact wordings are: "Well, I remembered it's the boy chasing the fly, ...," "Okay, it's about the kid swatting a fly, ...," or "Yes, it's about the boy and the fly."

The findings demonstrate first that episodic organization of narrative production is psychologically real: the story was memorized as episodes as shown in the present experimental data; secondly, episodes exist as memory chunks: an episode is remembered as a whole, and tends to be forgotten as a whole; thirdly, episodes are shown to be dominated by macropropositions: the paragraph level theme such as "the boy swats the fly" governs the lower level propositions which are elaborations of the macroproposition. Finally, the fact that the initial and the final episodes tend to be better remembered than the middle ones is also the manifestation of the effect of cognitive constraints on discourse production: initial information must form the foundation of the mental structure of the information being processed and it has a privileged place in language users' mental representation (Gernsbacher, 1989), and final information also has a privileged place in mental representation because of the short-term memory constraints. Because of this privileged position, initial and final information (or episodes in our study) are more resistant to being suppressed and they are more strongly enhanced and remembered.

4.5.4.2. Imposed episode boundary results in on-line task

According to the hypothesis, NPs should be selected for the first mention of a referent after an episode boundary is reached, and pronominals should be selected for the subsequent mention(s) of the referent within the episode. All tokens of such uses were counted as hits for the hypothesis. In addition, NPs used within an episode for the purpose of ambiguity resolution, which demonstrate the speaker's empathy with his listener's needs, also represents hits for the hypothesis. All other instances which run counter to the hypothesis were counted as misses. Table 4.11 (next page) shows the hit rates for each of the four experimental groups.

Anaphor	NP		PRON		ZERO		Hit Rate
Attention	EB	NEB	EB	NEB	EB	NEB	Percentage
Eng. Even	432	237	46	326	0	137	75.98 %
Eng. Odd	437	250	66	380	2	163	75.50 %
Man. Even	381	201	28	104	9	326	77.31 %
Man. Odd	427	196	25	79	12	314	77.87 %
TOTAL	1677	884	165	889	23	940	76.58 %

Table 4.11. Imposed Episode Boundary Results (on-line task only)

All four groups had very similar hit rates: 76.58% in average. There is no statistically significant difference for the hit rates between the two conditions of the same language groups (t = .15 for the English groups, and t = .06 for the Mandarin groups); and there is also no statistically significant difference between the two languages (t = 1.36). A five way (Subject X Condition X Form X Attention X Language) ANOVA analysis was also performed and the results are presented in Table 4.12 below.

	Source	Sum of Squares	DF	Mean Square	F
1.	Mean	154.59	1	154.59	xxxxx
2.	Lang	0.0032	1	0.0032	2.04
3.	Cond	0.0002	1	0.0002	0.11
4.	Form	2.0954	1	2.0954	30.72*
5.	Atten	2.6806	1	2.6806	47.14*
6.	Subj(L)	0.0278	18	0.0015	
7.	LC	0.0013	1	0.0013	0.76
8.	LF	0.0092	1	0.0092	0.13
9.	CF	0.0005	1	0.0005	0.01
10.	LA	0.0032	1	0.0032	0.06
11.	CA	0.0158	1	0.0158	0.67
12.	FA	20.0580	1	20.0580	922.02*
13.	SC(L)	0.0299	18	0.0017	
14.	SF(L)	1.2279	18	0.0682	
15.	SA(L)	1.0236	18	0.0569	
16.	LCF	0.0995	1	0.0995	1.47
17.	LCA	0.0111	1	0.0111	0.47
18.	LFA	0.0459	1	0.0459	2.11
19.	CFA	0.0030	1	0.0030	0.21
20.	SCF(L)	1.2223	18	0.0679	
21.	SCA(L)	0.4260	18	0.0237	
22.	SFA(L)	0.3916	18	0.0218	
23.	LCFA	0.0033	1	0.0033	0.24
24.	SCFA(L)	0.2543	18	0.0141	

Table 4.12. Five-way ANOVA Results

The table shows that among 18 interactions, only a two-order interaction was found to be significant: Form X Attention ($p < 0.01$). The interaction is presented in Figure 4.5. below based on the cell and marginal means.

Form X Attention Interaction ($p < 0.01$) :

	At Boundary	Within Boundary
NP	1.32	0.87
Pronominal	0.39	1.35

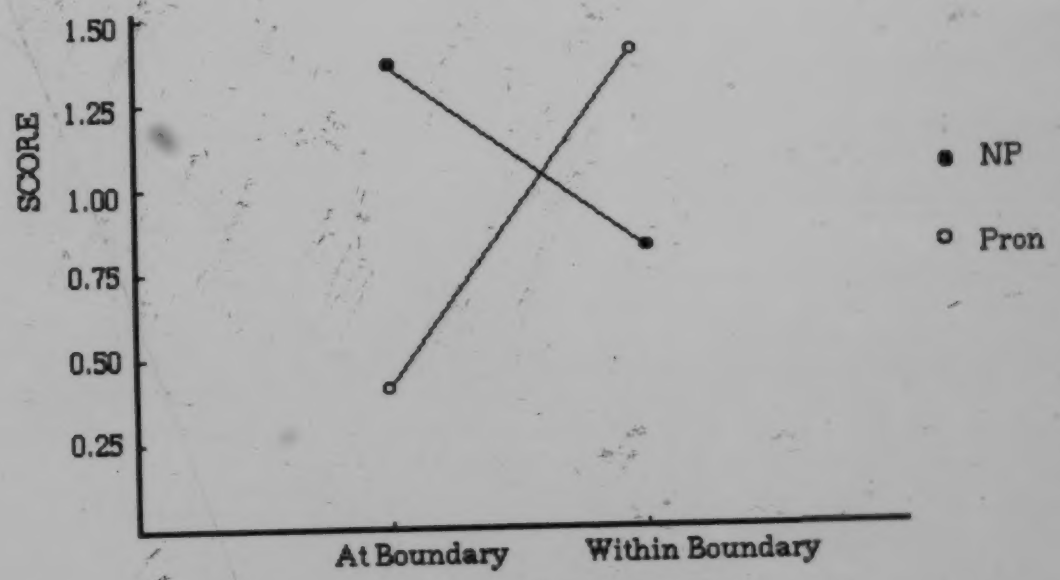

Figure 4.5. Form X Attention Interaction

Figure 4.5 shows that at the episode boundary, many NPs were used to reinstate reference and few pronominals to maintain reference, whereas within the episode boundary few NPs and many pronominals were used.

We may notice that the hit rates only reach 75% to 78% for all the four groups. However if we count NPs and pronominals (pronouns plus zero anaphora) separately for the boundary results (see Table 4.13. on next page), we will see that the proportions of NPs used within episodes drags down the overall hit rates.

Anaphor	NP		Hit Rate	PRON		Hit Rate
Attention	EB	NEB	Percentage	EB	NEB	Percentage
Eng. Even	432	237	64.57 %	46	463	90.96 %
Eng. Odd	437	250	63.61 %	68	543	88.87 %
Man. Even	381	201	65.46 %	37	430	92.08 %
Man. Odd	427	196	68.54 %	37	393	91.40 %
TOTAL	1677	884	65.48 %	188	1829	90.68 %

Table 4.13. Hit Rates for NPs and Pronominals

Table 4.13. clearly shows that (1) the hit rates of NPs are much lower than those of pronominals in all four experimental groups, and (2) the hit rates of both NPs and pronominals are very similar across experimental conditions and languages. Two reasons can account for this. First, although the tokens of NPs and pronominals counted for the episode boundary results included all those referring to human, non-human and inanimate referents, yet non-human and inanimates were more rarely referred to by pronominals (see Tables 4.7-4.9, Pages 72-75) than humans, and even human non-central referents were much less frequently maintained by pronominals than human central referents. That is, no matter whether within the episodes or at the episode boundaries, non-human and inanimate referents were most often reinstated by NPs, which caused a much lower hit rate of NPs on average across all the groups. Secondly, the fact that the hit rates are strikingly similar across languages and conditions shows that referential choice in narrative discourse is indeed controlled by cognitive processes of memory and attention regardless of where episode boundaries are imposed.

4.6. Summary

This chapter has presented the major findings of the experimental study. Five important observations regarding attentional and memorial effects on subjects' anaphoric options were made in the study: (1) in general human referents are much more frequently referred to by inexplicit anaphors than non-human referents; (2) for human referents, the central ones are more often maintained by pronominals than the non-central ones; (3) subjects' episodic organization of narrative production gives evidence that episodes exist as separate chunks in memory; (4) subjects' anaphoric

choice is shown to be controlled by episode boundaries; and (5) the strikingly similar results obtained from both language groups demonstrate the universality of the cognitive model of reference management in narrative production.

The next chapter will discuss in further detail the effect of attention and memory on speakers' anaphoric choice, based on these experimental results. It will also discuss cases of miss, i.e., intra-episode NPs (NPs used within episodes), and inter-episode pronominals (pronouns or zero anaphora used at episode boundaries) and will offer non-ad hoc explanations for such cases.

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* For the statistics carried out in the present study, the level of significance is set at 0.01 level. A value that reaches the level of significance is marked by an asterisk, and a value not so marked is not significant.

CHAPTER FIVE

DISCUSSION: ATTENTION EFFECT AND EXCEPTIONS

5.0. Preface

This chapter is a discussion, based on the results obtained from the experimental data, of the apparent effect of the cognitive processes of attention and memory on a speaker's anaphoric choices in narrative production. However, while episode boundaries, as tested in the two experimental conditions for the two languages, do appear to largely control a narrator's reference management, there remain some of the cases that run counter to expectations, i.e., NPs used within the episodes and pronominals used at the boundaries. The present chapter also offers several principled explanations to account for most of these exceptions.

5.1. Humanness and Attention

The previous chapter has given the general episode boundary results and the results of distributions of anaphors over all referents (both animate and inanimate). The present chapter focuses on the discussion of human referents only because human referents and their activities are what subjects focused on and described in their narrative production. As shown in Table 4.5., about 63% of all referents in the experimental data refer to humans -- the kid (male or female), the girl, the man, and the woman in the three episodes. It is obvious that humans are more generally the subjects and the topics of narrative and they are definitely the subjects of the stimulus materials used in the present experiment. Humans tend to attract our attention so much so that in many children's storybooks where there are only non-human characters or inanimate objects, such characters are personified and depicted as humans (e.g. they can think, they can talk, and they can reason, etc.).

In Givon's (1983) text-based cross linguistic studies of topic continuity (distance model), the influence of humanness as a continuity factor is recognized and discussed. Many studies show that there are huge differences between human and non-human (including inanimate) referents in terms of the two basic measurements for topic continuity, RD (referential distance: the distance, i.e., number of clauses, between the referent and its antecedent) and PS (persistence: how long, i.e., number of clauses, can a referent persist in subsequent clauses after the mention). On the one hand, humans have a much shorter RD than non-humans because humans are much more often referred to than non-humans in the texts being analyzed, and consequently the average distance between a referent and its antecedent is much shorter for humans than for non-humans; on

the other hand, humans have a much larger PS score than non-humans because humans are more topical and much more often referred to than non-humans, and consequently they persist longer on the scene than non-humans.

The results of the experiment also support the empathy hierarchy proposed by Kuno & Kaburaki (1977:653): human > animate nonhuman > thing. That is, the narrator always identifies with a human first. The hierarchy has been verified by S. Currah (1990) in her study of the pragmatic function of *wa* in Japanese.

All this suggests that human referents in texts as well as narratives are more topical, more central, and more frequently attended to than non-humans, and they therefore more easily attract attention and stay in focus in narratives and texts than do non-humans. In line with the present attention model, the human referents would enter focal attention of the speaker and the listener much more frequently than non-humans would in discourse, and therefore would be coded more frequently by inexplicit anaphors (i.e., pronominals) than are nonhuman referents. The present experimental results have supported this argument: of all referents counted for humans, 60% are pronominals; while of all referents counted for non-humans, 82% are NP's. This is quite congruent with Givon's psychological principle: "expend only as much energy on a task as is required for its performance" (1983:18). Because humans are more closely attended to by the speaker and the listener, less explicit anaphors are sufficient to encode and identify them.

We may argue that there is one more factor affecting subjects' anaphoric choice, which does not seem to involve attention. That is, the English pronoun system restricts the use of a pronoun for non-humans: while gender can often help distinguish one human from another when a pronoun is used, all non-humans have the same form: *it*. Consequently if more than one (as is generally the case) non-human appears in any setting, pronouns would probably cause confusion as to their referents. However this is not always true. Let us examine Table 5.1. below, which shows the pooled tokens of the two English groups for all the non-human referents.

	Fly	Lob	Ball	Paper	Bag	Others	Total
NP	164	80	251	238	221	389	1343
PRON	36	21	144	39	23	27	290
TOTAL	200	101	395	277	244	416	1633
%PRO	18.00%	19.40%	36.46%	14.08%	9.05%	6.49%	17.76%

Table 5.1. Frequency Distribution of Nonhuman Referents in the English Groups

Although non-humans are not frequently maintained by inexplicit anaphors, as shown in the last row of Table 5.1., differences still exist among the six non-human referents as to the proportions of pronominals. The percentage of pronominals used to refer to "the ball" in the first episode reaches 36.46%, which is only about 3% less than the pronominal rate (39.58%) of human non-central referents in the English groups. The inanimate referent "the ball" has the same pronominal form, *it*, as the other non-human referents, and its appearance in the first episode is always accompanied by other inanimate objects such as "the tennis rackets", "the stove", "the pot", "the spoon", etc.. Why, then, does "the ball" rather than the other accompanying referents often get pronominalized without causing confusion. This can again be accounted for by attentional effect: "the ball" is closely associated with human activities in the episode, and *it* persists much longer on the scene with the human referents and is mentioned frequently by subjects in describing the episode. When more than one non-human referent is mentioned, "the ball" wins the narrator's attention more easily and is realized as *it* more often than the other non-human referents. The frequent mentions and the pronominalization of "the ball" direct the referent to the listener's focal attention as well, allowing identification of the referent of *it* without problem. Example (1) below will help illustrate the point.

(1) Subject #4 (English Odd)

EPIS PROP TEXT

4 31 then the boy is up on a stool
4 32 while the girl is holding the stool
4 33 and 0 fishes the ball out with a fork
4 34 yes, that is in fact a soup pot on the stove
4 35 they have *it* out of the pot
4 36 but some sort of sticky stuff congeals to *it*
4 37 he takes *it* out
4 38 and 0 shows *it* to the girl

There are altogether six inanimate referents in the imposed episode, but the four pronouns unambiguously refer to "the ball", while the second mentions of "the stool" and "the pot" are NPs.

On the other hand, Mandarin serves as a better case for demonstrating the fact that pronoun system does not have much to do with the lower rate of pronominals for non-human referents than for human referents. As mentioned previously in the dissertation, there is no gender distinction for pronouns in spoken Mandarin; all referents, humans and non-humans fall under the aegis of *ta*. It would be expected that human and non-human referents have the same low proportions of pronouns in the Mandarin data if ambiguity is the major concern. However, they are not at all the same, as is evident from the experimental results: of all human referent tokens, 14% are pronouns; while for non-human referents, only 1% are pronouns.

All of this shows the influence of humanness as an attention factor which affects subject' anaphoric choice. However humans are not at all treated the same by subjects in narrative production. The influence of centrality seems to be a major factor determining anaphoric options, in addition to the episode boundary effect.

5.2. Centrality and Attention

Although humans are more generally the topics and the subjects of narratives, they are by no means all treated the same by speakers. The present experimental results show striking differences in subjects' anaphoric choice between human central and non-central referents: across all the four groups, 70% of the total tokens for human central referents are pronominals; in contrast, 70% of the total tokens for human non-central referents are NPs. Human central referents are called central because they are the focal characters and the center of narratives. Other non-central characters are generally made to set off the central character and help it achieve its prominence.

There are two points to be made concerning the cognitive processes of attention and memory, (as is discussed in Chapter Two above): (1) there are limits to activation both in terms of number of referents which can be activated at any one time, and the duration of activation without rehearsal; (2) focal attention is a particularly limited kind of processing state, requiring sustained expenditure of rather limited attentional resources. In other words, only two or three referents can be activated at any one time; and only one or two activated referents can enter focal attention at any given moment. When competing for attention, the human central referent is more likely to win than non-central ones, and tends to stay in focus longer. Since human central referents are more frequently attended to than non-central referents, less marking material, e.g., pronouns and zero anaphora (the maximum degree of attenuation) are sufficient in most cases for both the narrator and the listener to encode and identify them. Therefore, the huge difference in anaphoric options between central and non-central human referents found in the experimental data has verified the attention model and strengthened the general hypothesis.

The fact that the human central referent stays in focus much more frequently can be illustrated from another perspective -- the use of lexical pronouns by both English and Mandarin subjects. Of all 1169 pronouns used for human referents in the English data, only 19% (224 of them) referred to human non-central referents; and of all 438 pronouns used for human referents in the Mandarin data, only a mere 6% (25 of them) referred to non-human referents. It was found in the English data that sometimes even when gender of pronoun could distinguish referents, subjects still used pronouns to maintain the central character and NPs to reinstate the non-central character. For example,

(1) Subject #3 (English Even)

EPIS	PROP	TEXT
7	41	the girl wakes her father
7	42	the father looks quite angry
7	43	she looks quite embarrassed
7	44	and the newspapers are all over the floor
7	45	and she is trying to pick them up
7	46	but it's turning into some sort of a pile
7	38	and the father looks confused

This is an imposed episode from the second natural episode of the story ("Alex Pumpernickel ... swats"). In describing the episode, the subject kept focusing on the central character, the girl, realizing *she* by a lexical pronoun; while reinstating the non-central character, the father, with NPs within the episode although *he* could be used instead. A similar case can be found in the recall tasks.

(2) Subject #2 (English Even)

> In the last group of pictures, the boy was walking down the street, 0 turned the corner and 0 saw a lady 0 approaching him with a couple of bags in hand. He then asked the lady to help (..) he then asked the lady if he could help her carry the bags. She agreed and then the boy helped her carry the bags. He let the woman go ahead and 0 stopped at the corner of the house to look into the bag. He found out there was (uh) a lobster inside. And after he got bitten by the lobster he put it back into the bag, and 0 caught up to the woman. And he is looking rather embarrassed.

There are 14 mentions of the boy in the passage, of which two are NPs (one of them is the first mention), 8 are pronouns and 4 zero anaphora, while of 8 mentions of the woman in the passage, 4 are NPs (including the first mention), 3 are pronouns and 1 zero anaphor. If attentional factors did not affect the subject's anaphoric choice in the recall task, pronouns might have been expected to have been used for all subsequent mentions of both the referents after their first mentions.

On the other hand, NPs are seen to be used within imposed episodes when both of the human referents in a natural episode are of the same gender. However NPs were by no means used randomly to refer to any one of the referents within the imposed episode. The cognitive processes of attention govern ambiguity resolution as well. The general case is: NPs were used to reinstate the human non-central character, and pronouns were reserved for the human central character. For example,

3) Subject #2 (English Odd)

EPIS PROP TEXT

11	65	the little girl helps the lady
11	66	to carry the bag
11	67	and she is walking behind the lady
11	68	the lady is looking back at her
11	69	and they are smiling
11	70	she is following the lady
11	71	but 0 falls a little bit behind
11	72	and you can see her peeking around the corner at the lady [ ]
11	73	who is walking away

The subject reinstated both characters by NPs after the imposed boundary, but in the subsequent mentions within the episode, he consistently used pronouns to refer to the central referent, the girl, and NPs to refer to the non-central referent, the lady. Let us look at another example taken from the recall data, where the same method of resolving ambiguity was observed.

(4) Subject #9 (English Even)

> In the next story, the little girl is outside. And she is at a corner. And she meets a woman who is carrying some shopping bags. And she points at one of the bags. The woman gives her one and then she watches the woman walk away. She puts her bag down and 0 looks inside. And a big lobster jumps out and she looks very frightened. And then the woman comes back, and 0 puts the lobster back into the bag. And the little girl then follows the woman. She is looking quite embarrassed.

This example shows that after the first mention at the boundary, the central referent was maintained by inexplicit anaphors, while the non-central referent was referred to by NPs throughout the episode (except once). Again we see a remarkable way of differentiating between the central and non-central human referents by subjects when both of the referents are of the same gender. The narrator continued to use less marking material (maximal degree of attenuation) to refer to the central referent since the referent kept receiving his focal attention, and thus the narrator kept directing the listener to focus on the referent as well.

In the Mandarin data, it was found that pronouns were used to refer to the human central character almost exclusively: only 25 out of 438 pronouns used for human referents referred to non-central referents. Consequently in the on-line and the oral recall tasks, Mandarin subjects showed the same general patterns, only more drastically, of differentiating human referents as found in the English data: pronouns were reserved for the central referent, and NPs were used for the non-central referents. For example,

(5) Subject #3 (Mandarin Odd)

EPIS PROP TEXT

7 42 ta fuqin cong shafa-shang zuo-qilai
her father from sofa-on sit-up
her father sits up on the sofa
7 43 ta fuqin wen ta:
her father ask her
her father asks her
7 44 "ni zai gan shemo?"
you PROG do what
"what are you doing?"
7 45 ta shuo:
she say
7 46 "wo zai da cangying"
I PROG swat fly
she says: "I'm swatting a fly"
7 47 ta fuqin wen:
her father ask
her father asks
7 48 "cangying zai naer?"
fly at where
"where is the fly?"
7 49 ta shuo:
she say
7 50 "keneng 0 zai baoshi xiamian"
maybe at papers under
she says: "maybe (it's) underneath the newspapers

In this episode, all the mentions of the non-central character -- *ta fuqin*, ("her father") are NPs and all the mentions of the central character (identified here as a girl) are pronouns. Even in the Mandarin written recall task where gender can help distinguish the central from non-central referents, subjects still preferred NPs over pronouns for the non-central character. For example,

6) Subject #8 (Mandarin Even)

yige xiao nanhai zai jieshang xianguang, 0
a little boy at street loiter

kanjian yige lao furen 0 tizhe henduo daizi, 0 xianran
see a old woman carry many bags obvious

shi mai dongxi huilai. xiao nanhai xiang qu bangmang
is buy things back little boy want go help

ta zou guoqu, 0 cong lao furen shouli jieguo yige daizi,
he walk over from old woman hand take a bag

0 jinjin gengzhe lao furen zou. 0 zoudao yige jietou
closely follow old woman walk walk a street

guaijiao de difang, ta luohou ji bu, 0 ba
corner of place he fall-behind a-few steps OM

daizi dakai. limian pachu yizhi longxia, 0 xiale ta
bag open inside crawl-out a lobster scare he

yi-tiao. ta ba longxia chongxing zhuanghao, 0 ganjin
a-jump, he OM lobster again put-well quickly

zhuishang lao taitai.
catch-up old woman

A boy is loitering on the street and 0 sees an old woman 0 carrying many bags (who) obviously came back from shopping. The boy wants to help. He walks over and 0 takes a bag from the woman, and 0 follows the woman closely. 0 Walking to a street corner, he falls a few steps behind, and 0 opens the bag. From inside crawls out a lobster (that) scares him. He puts the lobster back in and 0 rushes to catch up with the old woman.

All the above examples demonstrate that cognitive processes of attention and memory do control subject's reference management during their narrative production. The influence of humanness and centrality of referents on subjects' anaphoric choice are also manifestations of attentional effect. Subjects from the two languages, which differ from each other in structures and pronoun system, show the same general patterns of referential production in terms of episode boundaries, humanness and centrality. It would be expected, based on the results obtained from the present study, that speakers of any languages would show the same general patterns of selecting anaphors in narrative production, as observed from the speakers of English and Mandarin Chinese. Cognitive processes governing the speaker's reference management appear to be universal.

The above discussion about the humanness and the centrality of referents explains why, on average, up to 25% of the anaphors found in the experimental data (see Table 4.11, Page 82) appear to be used contrary to the prediction of the episode boundary theory. In other words, the overall hit rate is greatly decreased by a large number of NPs referring to non-human referents within episode boundaries. Table 5.2. below shows the hit rate for each of the experimental groups based on the tokens of human referents only.

Anaphor	NP		PRON		ZERO		Hit Rate
	EB	NEB	EB	NEB	EB	NEB	Percentage
Eng. Even	223	83	44	267	0	130	83.00 %
Eng. Odd	220	102	61	317	2	150	80.40 %
Man. Even	210	48	26	101	4	270	88.16 %
Man. Odd	232	75	25	77	6	263	84.37 %
TOTAL	885	308	156	762	12	813	83.98 %

Table 5.2. Episode Boundary Results in the On-line Task (Human referents only)

Table 5.2. shows that the hit rate of human referents on average across the four groups increases by about 8 percent over that for all human and non-human referents (cf. Table 4.11, Page 82).

On the other hand, Table 5.1. shows that for both English and Mandarin groups, the hit rate in the Even condition is consistently about 3% higher than that in the Odd condition: 83.00% vs. 80.40% for the English groups, and 88.16% vs. 84.51% for the Mandarin groups. The different rates between the Even and Odd conditions, as discussed in the previous chapter, again gives evidence that an attentional factor does control subjects' referential choice based on episode boundary arrangements. In the Even condition, each of the natural episode boundaries coincides with one of the imposed boundaries, and no conflict occurs between them. However in the Odd condition, two of the three (the second and the third) natural episode boundaries are embedded within two of the imposed episodes, causing conflict between the imposed episodes and the natural boundaries. In other words, when a natural episode boundary fell within an imposed episode where referents should normally be maintained by pronominals, it might break a subject's sustained attentional effort at this point and force the subject to use an NP to reinstate reference. This is found to be the case: more than half of the subjects in the Odd condition employed NPs at such conflict points, and NPs within episode boundaries in the Odd conditions therefore appear more often than in the Even conditions, causing slightly lower hit rates in the Odd condition for both languages.

5.3. The Embedded Natural Episode Boundaries

As shown in Figures 4.1. and 4.2 (Pages 55-56), the difference between the Even and Odd conditions of the experiment resides in the different placement of the natural episode boundaries: in the Even condition, the three natural episode boundaries coincide with the imposed boundaries 1, 5 and 9, but in the Odd condition, two of the three (the second and the third) are embedded within the imposed episodes 5 and 9. Figure 4.2. is recaptured in Figure 5.1. on next page for convenience.

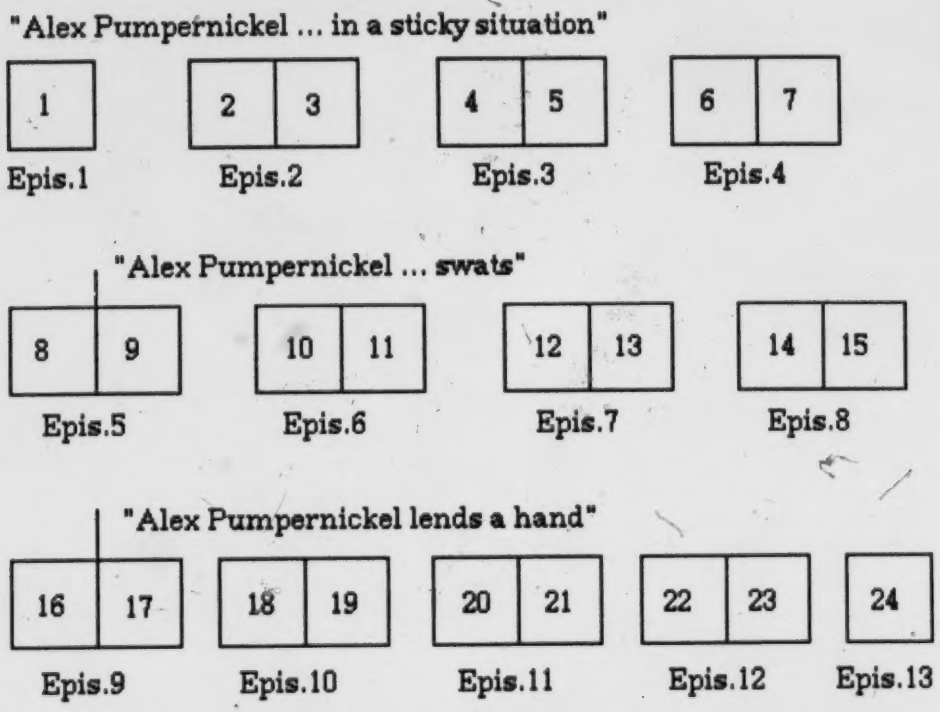


Figure 5.1. Picture Arrangement in the Odd Condition

As was discussed in 4.5.4.1. of the previous chapter, most of the subjects (19 out of 20 in the Even conditions and 15 out of 20 in the Odd conditions) were very sensitive to the natural episode boundaries and overtly mentioned that there were three episodes in the story in their recall task. However the conflict between the natural episode boundaries and the imposed episodes in the Odd condition appears to influence subjects' performance in different ways. First of all, in the recall task 15 out of 20 recognized and mentioned the three natural episodes. This shows that for the majority of the subjects, the natural episode boundaries were realized regardless of how the pictures were arranged. But on the other hand, the fact that five subjects in the Odd conditions did not recognized the three natural episodes may suggest that the Odd condition, where the imposed episodes broke the natural sequence of the original episodes, did suppress, though to a small degree, the

embedded natural episode boundaries, and affected some subjects' recognition ability.

Secondly, in the on-line description task, all 20 subjects in the Even condition marked the three natural episode boundaries since they coincide with three of the imposed boundaries, but in contrast only 11 out of the 15 subjects who overtly mentioned the three natural episodes in their recall recognized and marked the embedded natural boundaries. The other nine (including the five who recalled the three episodes as one) consistently marked one of the two embedded natural boundaries -- the second one, which is between the first and the second natural episode, -- but none of them ever marked the last embedded boundary. This indicates that the imposed episode boundaries did control subjects attention shifts in the on-line task and they sometimes overpowered the natural boundary, while in the recall task where the imposed boundary was not present, the natural boundary surfaced and was marked by subjects.

On the other hand, even for the nine subjects in the Odd condition, the second natural episode boundary was always recognized and marked. Why was the second natural boundary so special? Figure 5.1. shows that the second boundary appears embedded in imposed episode 5 which consists pictures 8 and 9, and the third boundary in imposed episode 9 which consists pictures 16 and 17. While picture 8 shows two little kids eating something off of a tennis ball in the backyard of a house, picture 9 shows one of the kids standing on a chair, trying to swat a fly in the living room inside the house. This episode experiences a major scenery change accompanied by the change of the participants. All this clearly marks a change of the episodes, which can be easily identified by subjects as the pictures were being processed. As for the third natural boundary within imposed episode 9, it was less easily identifiable because pictures 16 and 17 have the same participant, the little kid; and *he* seems to be chasing the fly out of the living-room in picture 16 and then appears walking on the street in picture 17. Although there is a scenery change in this imposed episode boundary, there still seems to be a connection between the two pictures, especially when they appear in the same frame. This is actually reflected in the recall of the five subjects in the Odd condition who tried to tie the three episodes together as one piece. The following examples illustrate two of these five subjects' recall at the point of the last natural episode boundary. For convenience, the two natural episodes are written as two separate paragraphs.

(7) Subject #7 (Recall) (English Odd)

... Then we see the fly again, and she is trying to swat the fly. And she doesn't seem to care about what she is doing.

And next, she is just outside the house, walking down the street.

(8) Subject #5 (Recall) (Mandarin Odd)

... ta mei zhaozhe 0, 0 que ba baozhi ren zai
she not find but OM paper throw at
nanren lianshang
man face

ta zuo-chu men, 0 kanjian yige nuren (keneng shi
she walk-out door see a woman maybe is
ta mama), 0 lingle henduo dongxi.
her mom carry many things

... She can't find (the fly), and throws the newspapers at her dad's face.

She walks out of the house and meets a woman (maybe her mother) who is carrying a lot of things.

For these two subjects, there was no boundary between the natural episodes and they chose lexical pronouns to maintain reference accordingly at this point.

To sum up, the above discussion has illustrated three significant points: (1) the majority of subjects were very sensitive to the natural episode boundaries and made an effort to mark them in the recall regardless of where the imposed boundaries were placed; (2) the imposed boundaries did control subjects' attentional effort and suppressed the embedded natural boundary to a certain extent in the on-line task; and (3) the greater the changes (of time, scene, participants, etc.) between the two episodes, the easier the boundary is to recognize and mark immediately.

5.4. Subjects' Performance in the Recall Tasks

So far we have examined and discussed the episode boundary results in the on-line description task, and verified that subjects' episodic organization, as a manifestation of cognitive processes, affects strongly subjects' reference management during their discourse production. The present section examines subjects' anaphoric choice in the recall task, where no imposed episodes and boundaries were involved.

5.4.1. Episode boundary results

As discussed in the previous chapter, the recall data from both the language groups gives evidence that episode boundaries were recognized and marked by subjects in their story processing. This demonstrates, as the boundary hypothesis (Mandler and Jonson, 1977; Kintsch, 1977; Haberlandt, B.& S., 1980) claims, that cognitive processes at the boundary statements/nodes are different from those at the inside statements/nodes of

the episode. The subjects had to devote a special effort to encoding the beginning statement/node because (1) the beginning contains the topical event of the episode which the subject tried to grasp during the quick flow of discourse processing, (2) at the beginning, the subject identified the protagonist of the episode and established a new memory location for the protagonist, and (3) at the beginning, the subject was assumed to shift his perspective, which broke his sustained attentional effort for the previous episode even when the protagonist of the episode remained the same.

Now let us examine in detail how subjects organized three natural episode boundaries in their recall task. In the Even condition, nine out of the ten English subjects and all the ten Mandarin subjects reinstated the central character with NPs at the natural episode boundaries even though they realized that the central character remained the same in the second and the third episodes. Also in the Even condition, almost all pronominals were used within the three episodes to maintain reference: all of the 235 pronominals in the Mandarin group and 340 out of all the 342 in English group. The only exception is Subject #10 (English), who used two pronouns to refer to the central character at the second and the third boundaries. In her recall she did not mention overtly that the story consists of three episodes and she integrated the three episodes into a connected story, beginning with "a day in the life of a child". The following example shows the partial recall of the subject.

(9) Subject #10 (Recall) (English Even)

> Retelling of the story: a day in the life of a child. Two children begin their day by going outside to play a game of tennis. ... They take the ball back outside and eat candy from around the ball.
>
> Then they go back into the house where the boy sees a fly. ... He finally is successful, kills the fly and goes outside.
>
> Once he is outside, he meets a lady carrying two bags of groceries. ...

The three paragraphs in (9) indicate the three original episodes in the story, and the subject used two pronouns at the two boundaries where she would have been expected to use NPs. However, this is not really a counter-example to the attention/episode theory discussed in the present study; it actually supports the theory given this subject's particular and idiosyncratic organization. In other words, there was only one episode for the subject and she chose her anaphoric expressions accordingly: no NPs were used at the unperceived episode boundaries.

To further illustrate the point, let us examine the recall data from the English and Mandarin Odd conditions, where another five subjects (2 English and 3 Mandarin) did not recognize the three natural episodes. The data reveal the same phenomenon: all 15 subjects who overtly indicated three natural episodes in their recall marked the three boundaries with NPs reinstating the central character. On the other hand, of all 363

pronominals counted in the English Odd data, 360 were used within the three episodes to maintain reference; and of all 297 pronominals counted in the Mandarin Odd data, 294 were so used. The exceptions were again made by these five subjects who recalled the story as a whole piece. Examples (10) below is a partial recall from Subject #1 (Mandarin), which show the same general pattern as did English Example (9) above.

(10) Subject #1 (Recall) (Mandarin Odd)

zhe shi yige pingshang de gushi. zhe tian shi
this is a ordinary of story this day is

yige jiari, tianqi hen hao. linjujia de haizi
a holiday weather very good neighbour of kid

lai zhao zhege gushi de xiao zhurengong (wo
come find this story of little protagonist (I

yixia cheng ta wei Bill) wanr. ... tamen ba yi
following call him as Bill play they OM a

da chuanr xiangchang la-dao waimian, 0 yibian wanr,
big string sausage take-to outside while play

0 yibian chi 0. ...
while eat

guole yihuir, xiao pengyou hui jia le, jiu
after a-while little friend return home PERF just

shengxia Bill yige ren, ta xiang-chu yige xin dianzi. ...
leave one man he think-out a new idea

zai yuanzi li ta pengshang mai dongxi huilai de
at yard in he meet buy thing back of

muqin. ...
mother

This is an ordinary story. It is a holiday, and the weather is fine. A neighborhood friend comes to play with the little protagonist of the story (I will call him Bill hereafter). ... They take a big string of sausage outside, eating while playing.

After a while, the little friend goes home and Bill is left alone. He thinks of a new idea. ...

At the yard he meets his mother (who) just came back from shopping. ...

It is obvious, as is evident from the recall data, that the encoding load at the

episode boundary was always greater than at the remaining part of the episode so that subjects expended more energy on the task at the boundary, and used more marking materials (e.g., NPs).

5.4.2. Within the episodes

Although no pronominals, strictly speaking, were used at the episode boundaries in the recall data, there were a considerable number of NPs used within the three episodes. Table 5.3. below shows the overall anaphoric production for human referents in the on-line and the recall tasks respectively for each of the four experimental conditions.

Anaphor		NP	PRON	ZERO	TOTAL
Eng. Even	OL	306	311	130	747
	RC	198	221	121	540
Eng. Odd	OL	322	368	152	842
	RC	202	269	94	565
Man. Even	OL	258	127	274	659
	RC	214	115	238	567
Man. Odd	OL	307	103	269	679
	RC	249	93	204	546

Table 5.3. On-line versus Recall Production

In general, the anaphors, especially NPs, used in the on-line task were many more in number than those used in the recall task because there were many more episodes in the stimulus material of the on-line task, which induced more NPs and consequently more pronominals. However, given the fact that episodes present in the on-line task are four times as many as those in the recall task, the number of NPs used in the recall task seems to be relatively large for three natural episodes when it still expected that NPs would be used only at the episode boundaries or for ambiguity resolution.

The following section attempts to offer explanations for NPs used within the episodes in the recall data, which seem on the surface to run counter to the hypothesis. Since there are two subsets of data (oral and written) collected from the Mandarin recall task, we will first of all examine whether or not Mandarin subjects performed differently between their written and oral recall before we start to discuss their general performance.

5.4.2.1. The Mandarin recall

Generally, Mandarin subjects used more NPs in the recall task than their English counterparts (214 vs. 198 in the Even condition, and 249 vs. 202 in the Odd condition). This was expected because Mandarin pronouns have no gender distinction in oral form, and subjects had to use NPs in cases where English gender-marked pronouns could come into play to differentiate between referents. Table 5.4. below shows the distribution of anaphors over the central and non-central referents.

Condition	Even		Odd	
Referent	Hum-C	Hum-NC	Hum-C	Hum-NC
NP	105	109	127	122
PRON	113	2	87	6
ZERO	197	41	170	34
TOTAL	415	152	384	162
% NP	25.30	71.71	33.07	75.31
% PRON	27.23	1.32	22.66	3.70
% ZERO	47.47	26.97	44.27	20.99

Table 5.4. Anaphors Referring to Human Referents in Mandarin Recall Task

Although the Mandarin recall data contains more NPs than the English, the proportion of NPs referring to the central character is still much less than that referring to the non-central characters: 27% vs. 73% on average. The difference between the central and non-central characters is even greater compared to that calculated for the English recall (25% vs. 59% on average), showing that proportionally more NPs were used by Mandarin subjects to refer to the non-central referents than by English subjects in the recall task.

On the other hand, two sets of data (written and oral recall) were collected for the Mandarin recall task since the Mandarin third person pronouns have gender distinction in their written form. It was expected that Mandarin subjects would use more lexical pronouns in their written recall to differentiate between referents than in their oral recall. However there is not much difference found in the results for the two sets of data. Table 5.5. (next page) shows the results obtained from both the written and oral recalls.

		Hum-C			Hum-NC			TOTAL
		NP	PRON	ZERO	NP	PRON	ZERO	
Even	WTN	48	56	100	51	0	20	275
	ORL	57	57	97	58	2	21	292
Odd	WTN	59	42	84	57	2	19	263
	ORL	68	45	86	65	4	15	283
TOTAL		232	200	367	231	8	75	1113

Table 5.5. Mandarin Written and Oral Recall

Comparing lexical pronouns used between the written and oral recall in Table 5.5, there is no difference found for the human central character: for the Even condition, 27.45% in the written and 27.01% in the oral; for the Odd condition, 22.70% in the written and 22.61% in the oral. As for the human non-central characters, lexical pronouns used in the written recall are even fewer than those used in the oral recall. For example,

(11) Subject #2 (Written Recall) (Mandarin Even)

...

yige haizi zai jie-shang sanbu, 0 zhuan-guo jie-
a kid at street-on walk turn-over street

jiao, 0 yujian yige [shuang-shou timan le dongxi de]
corner meet a both-hand carry PERF thing RP

furen. ta shangqian wen na furen ta shifou keyi
woman he forward ask that woman he whether can

bangmang. furen hen gaoxin, 0 gei ta yige koudai.
help woman very happy give him a bag

ta tiqi koudai, 0 jiu gengle shangqu. koudai li de
he take bag just follow up bag in of

dongxi zai butingde dong, ta hen haoqi. 0 deng
thing PROG restlessly move he very curious wait

na funu zhuan-guo jie-jiao, 0 kan-bu-jian ta
that woman turn-over street-corner see-not him

shi, ta toutou da-kai koudai. buliao beng-chu
when he stealthily open-up bag suddenly jump-out

yizhi da pangxie, 0 ba tade lian zhapo le. ta
a big crab OM his face scratch PERF he

ganjing bao-shang koudai, 0 guaiguai gan-shang
hurriedly tie-up bag obediently catch-up

na furen.
that woman

A child is walking on the street, (he) turns a street corner and see a woman (whose) hands are full of groceries. He steps forward to ask the woman if he can help. The woman is very glad and gives him a bag. He takes the bag and follows (her). Something inside the bag is moving restlessly. He is curious. (He) waits till the woman turns over a corner and can no longer see him, he opens up the bag stealthily. Out jumps a big crab and scratches his face. He ties up the bag hurriedly and catches up with the woman.

The above excerpt is taken from a subject's written recall of the third episode of the story, which has two characters of different gender: a boy and a woman. All lexical pronouns were used to refer to the central character even though a pronoun of feminine gender could have been used to refer to the woman within the episode. Such a pattern of anaphoric choice is observed throughout the entire written recall. It is clear that although gender can distinguish between referents in Mandarin written recall, subjects still preferred using pronouns to maintain the central character and NPs reinstate the non-central ones, much like what happened in the Mandarin oral recall. Since no difference is found in subjects' anaphoric choice between the Mandarin written and oral recalls, the two sets of data will be discussed as one in the following section.

5.4.2.2. NPs used within the episodes

Let us now examine NPs used within the episodes and see whether the hypothesis of the present study can account for those apparent exceptions. There are several reasons, apart from cases of ambiguity resolution, which explain why the number of NPs referring to human referents used within episodes in the recall data is relatively large. First of all, as is evident from the discussion of the Mandarin recall data, the non-central characters of the story are less likely to get pronominalized. Table 5.6. (next page) gives the exact proportions of NPs and pronominals used in the two English conditions (cf. Table 5.3, Page 100).

Condition	Even		Odd	
Referent	Hum-C	Hum-NC	Hum-C	Hum-NC
NP	96	102	97	105
PRON	182	39	210	59
ZERO	91	30	80	14
TOTAL	369	171	387	178
% NP	26.02	59.65	25.06	58.99
% PRON	49.32	22.81	54.26	33.15
% ZERO	24.66	17.54	20.68	7.86

Table 5.6. Anaphors Referring to Human Referents in English Recall

Here in the recall data, we again find that the human central referent is more likely to be maintained by pronominals than are the non-central referents within the episodes. For example,

(12) Subject #5 (Recall) (English Even)

...

The child went outside. Just as he went around the corner, he saw his mother 0 coming home with some groceries. So he stopped and 0 asked his mother what was inside the bag. She then gave him one of the bags to carry and they proceeded on. He was following his mother. Then the curiosity of the boy got the better of him because he stopped. He had to see what was in the bag. He opened up the bag and out jumped this big lobster and 0 scared him. So he put the lobster back in. Because he was scared, he was crying a little bit and 0 picked up the bag, and 0 followed his mother back into the house.

This differential use of anaphors between the central and non-central referents thus resulted in more NPs than expected occurring within the episodes.

Secondly, about half of the NPs used within the episodes came from the first episode "Alex Pumpernickel ... in a sticky situation," which starts with a boy and a girl playing tennis and ends with the boy and the girl eating the sticky candy off the ball. There were an unexpected number of NPs used within this particular episode because of the following reasons. (1) At the beginning of the recall task, subjects usually established and identified the participants with more NPs than expected. Many of the recalls start with "There are a boy and a girl in the story. The boy ... and the girl ...". Instead of two NPs for the first mentions of the characters, the

beginning of the episode commonly witnesses four. (2) Both of the participants appeared in each of the eight pictures and both took part in the activities together, subjects thus tended to take both as the central characters of the episode. Some subjects simply referred to the both together as "the two children", "one of the kids", "the other kid" without mentioning the gender. This also resulted in more NPs in this episode. (3) For the English subjects (10 out of 20) who regarded the two children as being of the same gender, NPs had to be used very often to distinguish between the two characters. The following examples will help illustrate the above points.

(13) Subject #8 (Recall) (Mandarin Odd)

zhe shi sange xiao gushi. diyige gushi shi yige xiao
this is three small story first story is a small

nanhai he yige xiao nuhai zhengzai da wangqiu.
boy and a small girl PROG play tennis

xianshi zhe xiao nuhai fa-qiu gei zhe nanhai,
first this small girl shoot-ball to this boy
...

There are three short stories. The first one is a little boy and a little girl playing tennis. The girl shoots the ball to the boy first, ...

(14) Subject #4 (Recall) (English Even)

This appears to be three separate stories. The first story, .. and in each of these stories, the story role is taken by a fat child with a pig-tail. In the first story, the child is playing tennis outside with another friend, another little kid. And they were playing just outside a large house. The thinner child hit the ball towards the fat child, the fat child hit it and it went back toward the thin child. The thin child tried to get it, but missed. And the ball went into a window. ...

Thirdly, in all the three episodes in the story, there are changes of scenes, changes of participants, changes of perspectives or point of views within each episode. Subjects tended to use NPs to reinstate reference at such places to mark the changes, i.e. to treat these as indicating sub-episodes in the story structure. Let us look at some of these changes. In the first episode after Alex broke the window, the two children approach the window to see what happened to the tennis ball. Right there, there are changes in scenes (from the backyard to the kitchen) and activities (stopping playing tennis and starting looking for the ball). In the second episode when Alex hits the man, a new character appears and something surprising changes the perspective of the story. Also in the third episode when Alex stops at the corner of the street with the woman walking out of sight, there is a shift of focus from the interaction of the both characters to the action of Alex alone. At these specific points, many subjects used NPs to reinstate Alex, although pronouns had been used to refer to *him/her* after

the first mention up to these points. The following examples illustrate the significant changes within the episode where NPs were employed instead of pronouns. A slash "/" is added to denote the place of the change, and NPs used at such a point are underlined in the examples.

(15) Subject #10 (Written Recall) (Mandarin Odd)

yige qinglang de xia-ri, liangge haizi zai
a fine of ummer-day two kid PROG

da wangqiu. tamen shi yige nanhai, yige nuhai.
play tennis they is a boy a girl

nanhai shi gushi de zhujiao. ta ba qiu da gei
boy is story of protagonist he OM ball hit to

nuhaizi, nuhai you ba qiu da gei ta. ta hui
girl girl again OM ball hit to him he return

qiu shi yong li guo da, jieguo qiu da-zai
ball when use strength over hard so ball hit-at

yige fangzi de boli-shang, 0 ba boli dasui le. /
a house of window-on OM glass break PERF

<u>xiao nanhai</u> pao-dao chuang-xia, ...
small boy rush-to window-side

It's a fine summer day. Two children are playing tennis. They are a boy and a girl. The boy is the protagonist of the story. He shoots the ball to the girl and the girl shoots the ball to him. But (he) tries too hard when he hits the ball back. So the ball hits the window of a house and breaks the window./ <u>The boy</u> rushes to the window, ...

(16) Subject #3 (recall) (English Even)

...

The second story. There was a little girl 0 standing on a chair in a living-room. There was a couch beside with newspapers. And she is after a fly. She is using a flying swatter, and she swats towards the fly but 0 misses. And she jumps off the chair and 0 ends up swatting the top of the newspapers. Unfortunately there is somebody underneath the newspapers, probably her father, who jumps when the top of the newspapers were slapped, and 0 sits up and the newspapers fall everywhere. He looks very angry. / <u>The girl</u> looks fairly upset. So she starts to try to straighten the newspapers, but she looks like she kind of gives up, (uh..) gathers them together, throws them towards the man. And he's just sitting there, 0 not quite sure what's going on. And she continues to pursuit of the fly with the fly-swatter (..) or the insect.

(17) Subject #9 (recall) (English Odd)

...

Then the final, the third event, the girl is out on the street and sees this woman 0 coming toward her. And the woman might even be her mother 0 carrying some groceries. And she stops and 0 enquires,(..) she stops the woman and 0 asks her about what bags she's carrying. (..) I guess she offers to carry one of the bags. And so the woman gives her a bag. / And then the little girl stops and 0 lets the woman get farther ahead and around a corner. Then when the woman goes around the corner, she stops and she is curious about what's in the bag. She opens it up and a lobster jumps out ...

The discussion, accompanied by the examples of this section, demonstrates that NPs occurring within the three episodes in the recall task can be accounted for by several explanations: the non-central characters are more likely to be reinstated by NPs within the episode; the special features of the first episode make subjects use more NPs within the episode; and changes of scenes, participants, activities and point of views within the episode demand greater encoding effort and subjects tended to mark these changes by NPs. The differential use of anaphors by subjects during their narrative production not only reflects cognitive factors of attention and memory, but also directs the listener to identify uniquely the right referent, the episode boundary, the change of participants and perspective, etc. In conclusion, the exceptions discussed above are shown to be rule-governed, which indeed supports the hypothesis of the present study from a different angle.

5.5. Exceptions In The On-line Task

Section 5.3.2.2. discusses the cases in the recall task that appear to run counter to the general hypothesis; that is, cases where NPs were used within the episodes to reinstate reference. The facts just examined make abundantly clear that many of these cases are not genuine counter-examples, but their occurrence is still tied to subjects' attentional effort when they engaged in the course of narrative production. The present section examines the same exceptions, the misses, occurring in the on-line task, where there were many more (imposed) episode boundaries present in the stimulus material.

Table 5.1. (Page 87) shows that for all four experimental groups, there remain about 16% of cases on average that run counter to expectations. In general, the Mandarin groups produce fewer (about 5%) cases of misses than the English groups; and the Even condition produces fewer (about 3%) cases of misses than the Odd condition. There are several explanations that account for most of these exceptions, leaving a very small number to be attributed to idiosyncratic factors. The exceptions will be discussed in two parts: NPs within the episode, and pronominals at the boundary.

5.5.1. NPs within the episode

There are more nominal misses than pronominal ones: about two thirds of all misses are NPs used within the episode, i.e., intra-episode NPs. The occurrences of intra-episode NPs found in the on-line task are very similar to those in the recall task. First of all, as elaborated in the previous sections, the non-central characters of the story frequently get nominalized within the episode even when gender of pronoun could distinguish between referents. This pattern accounts for about 40% of the intra-episode NPs in both language groups.

Secondly, the first two imposed episodes of the story witness more intra-episode NPs than most of the other imposed episodes. They are generally full of NPs and pronominals are rarely seen in them. As discussed previously, subjects' encoding load is greater at the episode boundary, and especially at the very first one, because at the very beginning of the task the subject has several things going on in his mind: he has to grasp the topic event of the episode, he has to identify the protagonist of the episode and establish a new memory location for the protagonist; and at the very beginning he also lacks the expectations that facilitate his inference processes. In a word, he has to devote greater attentional, and consequently encoding effort at the very beginning of the task. Subjects thus used more NPs at this point because (1) they have a heavy encoding load, and (2) they are not certain about the central character of the story since both of the characters are seen to be active at the beginning. For example,

(18) Subject #10 (On-line) (English Even)

EPIS	PROP	TEXT
1	1	a young boy and a girl are playing tennis in the backyard of their house
1	2	the girl has just served the ball to the boy
1	3	and the boy is returning the serve to the girl

Actually many of the subjects regarded both characters in the first natural episode ("Alex Pumpernickel ... in a sticky situation") as central characters. Because of this, about half of the subjects (Mandarin subjects especially) did not differentiate the two with gender, but referred to them as "the two friends/children/kids", "both of the children/friends/", and consequently "they/them" when they maintain reference within the episode. This results in more NPs in the entire natural episode (the first four/five imposed episodes), which account for about another 25% of the intra-episode NPs.

Thirdly, there are on average 5% more cases of intra-episode NPs in the Odd conditions than in the Even condition of the on-line task for both languages. This is so, as pointed out in the previous discussion, because of the "interference" of the natural episode boundaries in the Odd condition.

Finally, there are altogether 6 subjects (4 in English and 2 in Mandarin) who described the dual picture frame as if the two pictures were presented to them individually. In other words, after they finished

describing one of the two pictures in a single frame, they would start the other picture with "the second picture", "the picture on the right", "the next one" etc.. The interesting point is that these subjects used NPs to reinstate reference following their mention of the next picture. For example,

(19) Subject #6 (On-line) (English Odd)

EPIS	PROP	TEXT
6	32	in the next picture, the boy has jumped off the chair
6	33	and he is trying to swat the fly [ ]
6	34	which is now closer to the papers
6	35	in the next picture, the boy swats .. tries to swat the fly
		...
7	40	next picture, the boy's father sits up
7	41	and 0 stares at him
7	42	and he is embarrassed
7	43	and in the next picture, the boy is covered by a heap of papers

All six subjects did this consistently when they described the second picture in a dual frame as if there were a boundary between the two pictures. Such behavior of subjects was also observed in Tomlin's study (1987) where he explains: "the subject is clearly performing the task differently than other subjects, keeping each slide individually and distinctly in mind as he proceeded through the task" (p. 470). It is suspected that some subjects are more sensitive than others in detecting episode boundaries: two pictures placed side by side with a line drawn in the middle may cause them break their sustained attentional effort and start a new episode. Since only 15% (6 out of 40) of the subjects behaved this way, such cases can be attributed to the factor of idiosyncrasy. However, cases like this account for 24% of all intra-episode NPs. Moreover this factor is the major cause of the English groups producing 9% more intra-episode NPs than did the Mandarin groups, since more subjects behaved this way than Mandarin subjects.

The remaining 6% of the intra-episode NPs can also be attributed to the factor of idiosyncrasy: although in general, the non-central characters were referred to by NPs within the episode, some subjects used NPs and pronominals alternatively within the episode to refer to the both characters when the non-central characters is of the same gender with the central one. For example,

(20) Subject #9 (On-line) (English Odd)

EPIS	PROP	TEXT
10	75	then she comes to a corner
10	76	and there's a woman
10	77	0 approaching her
10	78	the woman is carrying bags full of groceries
10	79	she is coming along the sidewalk
10	80	and the little girl seems to ask this woman
10	81	what she has got in the bags

The above discussion shows that most of the intra-episode NPs are not genuine counter-examples that run against the general hypothesis. Most were still used in line with subject's episodic organization during narrative production.

5.5.2. Pronominals used at the episode boundary

The cases of inter-episode pronominals are about one third (about 5.5%) of all misses, and most of them are lexical pronouns. In general, the Mandarin groups produced 2% fewer of inter-episode pronominals than did their English counterparts. Table 5.7. below shows the distributions of misses in each of the four experimental groups.

Anaphor	PRON		ZERO		Miss Rate
	EB	NEB	EB	NEB	Percentage
Eng. Even	44	267	0	130	5.89 %
Eng. Odd	61	307	2	150	7.48 %
Man. Even	26	101	4	270	4.55 %
Man. Odd	25	77	6	263	4.57 %

Table 5.7. Miss Rate of Inter-Episode Pronouns

The experimental data reveal certain regularities about the occurrences of these inter-episode pronouns. First of all, about 80% of the subjects in both the Even and Odd conditions marked most of the 12/13 imposed boundaries with NPs reinstating reference. However some of the subjects seemed to overcome the imposed boundaries gradually and were later in the on-line description only sensitive to the natural episode boundary, especially when they came to the last natural episode. Subjects in both conditions showed strikingly similar patterns at this point: they started using pronouns to refer to the central character at the last imposed episode (EPIS 8/9) of the second natural episode and then reinstated the central character with an NP when they crossed the natural boundary; after that they used pronouns to refer to the central character through to the end regardless of the imposed boundaries. Altogether five subjects in the Even condition (3 English and 2 Mandarin), and five subjects in the Odd condition (3 English and 2 Mandarin) did so, and the pronouns thus used account for about 30% of all inter-episode pronouns. It is interesting to see that though the central character was maintained with pronouns in the last natural episode, non-central characters in these imposed episodes were still referred to by NPs regardless of whether *he/she* were of the same gender as the central character. For example,

(21) Subject #10 (On-line) (English Even)

EPIS	PROP	TEXT
8	30	he continues to look for the fly in the papers
8	31	and the father is sitting scratching his head
8	32	while the son is scattering the papers
8	33	and 0 throwing the papers back onto his father's face
8	34	and he is continuing to chase the fly
*9	35	the boy is successful
9	36	he leaves the house
9	37	and 0 sees a woman
10	38	he stops
10	39	to talk to the woman
10	40	and 0 offers
10	41	to take carry her groceries
11	42	he takes one bag
11	43	and 0 follows the woman down the street
11	44	at the corner, he stops
11	45	and 0 digs in the bag
12	46	much to his surprise and pain, he discovers a crab
12	47	0 crying and injured
12	48	he continues
12	49	to follow the woman down the street

(22) Subject #7 (On-line) (English Odd)

EPIS	PROP	TEXT
*9	84	then she leaves
9	85	she seems to be walking away from the scene
10	86	she sees a middle-aged woman [ ]
10	87	who is frowning and walking down the street with bags
10	88	she stops the woman
10	89	...
11	92	she may have asked the woman
11	93	if she could carry one of the bags
11	94	the woman seems to be happy
11	95	...
12	107	in fact, she turns around
12	108	and 0 goes around the corner
12	109	...
13	116	the woman must have heard her cry ...

The examples are typical of the cases of inter-episode pronouns used in the both conditions. However 2 out of the 4 subjects in the Odd condition did not mark the last natural episode boundary (as shown in the above excerpt) since it was embedded in an imposed episode (EPIS 9).

Secondly, about 55% of all inter-episode pronouns were used at the imposed boundaries but not at the natural boundaries. Almost all of them were used to refer to the central character of the story. It seems that some subjects were more sensitive to the natural boundaries than to the imposed boundaries, and they sometimes overcame the imposed boundaries and kept the central character in focus until the natural boundaries were reached.

Thirdly, the rest of 15% of inter-episode pronouns all came from 2 subjects (1 in the Mandarin Odd condition, and 1 in the English Odd condition), who recalled the three episode as if they were a single one. These two subjects were especially insensitive to the episode boundaries and they did not mark any of the imposed and natural boundaries except for the first mention of the central character. Each of them introduced the participants of the story for the first time at the very beginning of the description, and then used pronouns throughout the entire task to refer to the central character. The reason why these subjects appeared to be "immune" to the recognition of episode boundaries is not clear at the moment, and these 15% (about 5% of all misses) of the inter-episode pronouns are considered to be genuine counter-examples although the fact that they are generated by only two subjects suggests that an explanation must be sought in the realm of individual differences in language/task abilities.

5.6. Summary

This chapter has discussed how cognitive processes of attention and memory control subjects' anaphoric choice, based on the data collected from the experimental study. The discussion has demonstrated that during both the on-line and recall tasks, subjects selected anaphoric devices depending on their episodic organization of the story processing, the pragmatic status of the participants, the supposed needs of the listener, and the contextual and discourse information at hand, all of which are indeed manifestations of discourse as well as cognitive constraints.

The chapter has also argued, through the illustration of the exceptions, i.e. intra-episode NPs and inter-episode pronouns, that many of the exceptions are not genuine counter-examples that run against the general hypothesis of the present study. The majority of the exceptions occurred in line with the attentional theory: intra-episode NPs used to refer to the non-central characters, intra-episode NPs used to mark the embedded natural episode boundaries, intra-episode NPs used at the first two imposed episodes to identify and establish a new memory location for the protagonist; and inter-episode pronouns used to maintain the central

character. All those actually support and strengthen the general hypothesis.

The next chapter will focus on a language-specific issue: pronominals in the Mandarin anaphoric system.

CHAPTER SIX

MANDARIN PRONOMINAL SYSTEM

6.0. Preface

Chapters Four and Five have demonstrated that subjects of both languages show striking similarities in the general patterns of anaphoric choice during narrative production: referents that tend to attract attention and stay in focus get pronominalized more frequently; referents that are more "peripheral" to focal attention, such as non-human and non-central characters, are more likely to get nominalized. However there is one major difference between subjects of the two languages in the use of lexical versus zero pronouns: English subjects used lexical pronouns more extensively than zero anaphora (32% vs. 12% on overall average); Mandarin subjects used zero anaphora more frequently than lexical pronouns (30% vs. 10% on overall average). While the occurrence of English zero anaphora is syntactically conditioned, the occurrence of Mandarin zero anaphora depends greatly on information outside syntactic constraints. The present chapter attempts to account for the appearance of lexical versus zero anaphors in Mandarin discourse, based on the data collected from the subjects' narrative production.

6.1. Zero Anaphor

6.1.1. Its interpretation

According to the general hypothesis proposed in the present study, referents that have entered subjects' focal attention will be coded by less coding material, i.e., lexical pronouns or zero anaphors. This is indeed the case. Zero anaphors, the minimal marking material, were never used by the Mandarin subjects at the natural episode boundaries and rarely used at the imposed boundaries (less than 2%) in both the Even and Odd conditions. Moreover zero anaphors were used twice as often as lexical pronouns within the episode in both the recall (including the written recall) and the on-line data. This is in accord with Li and Thompson's (1979) observation that zero anaphora in Mandarin Chinese is more often the norm and lexical pronouns are the exception. Zero anaphors, as evident from the results of the present experimental data, are fairly widespread in both Mandarin oral and written discourse. They can be used in various grammatical positions of a sentence, and they can be used to refer to both human and non-human referents. "There are no structural properties

predicting the interpretation of the referent for zero-pronouns but ... the interpretation of the referent for the unrealized pronoun is inferred on the basis of the pragmatic situation" (Li & Thompson, 1979: 312). In other words, the occurrence of zero anaphora can not be accounted for by pure structural factors, but largely depends on semantic, pragmatic, and contextual information. Let us take some excerpts from the Mandarin data to illustrate the above point. All zero anaphors in the examples below are numbered for the convenience of discussion.

(1) a. yige haizi kanjian qiang-shang you zhi cangying
a kid see wall-on have a fly
a child sees a fly on the wall
b. ta jiu ban-lai yige yizi
he just move-over a chair
c. 01 zhan-zai yizi shang
stand-at chair on
(he) moves a chair over and stands on the chair
d. 02 ju-qi cangying pai
raise-up fly swatter
e. 03 zhunbei da 04
ready swat
(he) raises the fly-swatter and is about to swat (the fly)
f. zhe-shi na cangying fei qilai
this-time that fly fly up
just then the fly flies up
h. ta jiu ganjin tiao guoqu
he just hurry jump over
he just jumps over hurriedly
i. 05 tiao guoqu yihou
jump over after
j. 06 kan-bu-jian nazhi cangying le
see-not that fly PERF
after (he) jumps over, (he) can't see the fly
k. 07 keneng fei-jin shafa-shang de yi-dui baozhi li
maybe fly-in sofa-on of a-pile paper in
(it) may fly into a pile of newspapers on a sofa

There are seven zero anaphors occurring in the excerpt. The first three are in the subject position, and structurally they can be easily identified as coreferential with the subject of the first and second clause. On the other hand 04, which is in the object position of (1e), would be co-referential with the object ("the fly-swatter") of the previous clause (1d) if constrained syntactically. However, pragmatically it does not make much sense that the child should swat the fly-swatter which, interpreted semantically, would be the implied instrumental. From the context we have no difficulty interpreting 04 as "the fly" which is introduced earlier in the discourse. Furthermore, 07 poses the same problem. While 05 and 06 all refer to the subject ("he") of (1h), 07 cannot be coreferential with the same subject although syntactically it should. The identification of 07 follows from the

pragmatic interpretation of the clause: 07 can only refer to the object of the previous clause "the fly" that can literally fly into the newspapers, not its subject "the child". Let us now examine another example.

(2) a. zhe nanhai ba daizi fang-zai di-shang
this boy OM bag put-at ground-on
the boy puts the bag on the ground
b. 01 xiang kankan limain shi shemo dongxi
want see inside is what thing
(he) wants to see what's inside
c. ta gang ba shou fang jinqu 02
he just OM hand put in
d. 03 yixia jiu bei shemo dongxi jiazhu le
suddenly just PM some thing pinch PERF
just as he puts his hand in (the bag), (it) is pinched by something
e. yuanlai 04 shi yizhi pangxie
so is a crab
f. 05 ba tade shou yaozhu le
OM his hand pinch PERF
(it) is a crab that pinches his hand
g. 06 dashengdi ku-jiao qilai
loudly cry-shout up
(he) starts to scream

Again, the referent of 03, which is in the subject position, is not coreferential with the subject of the previous clause, but with its preposed object "his hand" because pragmatically only "his hand" which the child puts in the bag can be pinched by something in the bag. Likewise 04, the subject of (1e) cannot be coreferential with the subject ("his hand") in (1d), but with its agent ("something"). Finally 06 can only refer to the child mentioned earlier in the discourse, not the subject of the previous clause ("the crab") because pragmatically crabs do not scream.

The two excerpts above illustrate the point made earlier in the section: the occurrence of zero anaphora in Mandarin discourse can not be accounted for by pure structural properties (see also Li and Thompson, 1979). The identification of zero anaphora is determined mostly by pragmatic and contextual information. Largely due to extra-linguistic information, Mandarin speakers are able to use zero anaphora, both phonologically and lexically empty, to code referents so widely without causing confusion on the part of the listener.

6.1.2. Its occurrence

However, the question remains why Mandarin speakers prefer zero anaphora over lexical pronouns in discourse production since the two anaphoric devices can be used interchangeably in many cases. The major reason for this may be the demand of efficient and effective communication. In order to achieve maximally effective communication, a speaker of any language will not likely spell out every minute detail, which would require

much time/space to convey very little information; the general case would be that the speaker's production will show a minimal amount of formal cohesion, assume massive amounts of existing background knowledge, and demand much interpretive work, via inference, for the listener. For Mandarin Chinese, this is especially the case. Since this is a highly non-redundant language which, on the one hand, lacks verbal morphology to denote the tense and aspect of a sentence and the grammatical relations between sentence elements; and on the other hand, leaves various positions in a sentence unspecified if the speaker assumes that they can be inferred by the listener from semantic-pragmatic information and discourse context. Our experimental data reveal several most frequently occurring types of zero anaphora in speakers' narrative production. First of all, when the subject introduced in the first clause of an imposed episode is also the subject of the following consecutive clauses, the following subjects are often left unspecified. Although lexical pronouns could replace zero anaphors in such cases, zero anaphors are normally preferred since they avoid redundancy and repetition, and are fully recoverable from the discourse context. Conventionally, such a chain of clauses is called a "topic chain" (see Li and Thompson, 1979:313); from the perspective of the present study, its elements are within the sustained attentional span of the speaker and listener on the one hand, and are quite continuous both topically and thematically on the other. For example,

(3) a. zhe haizi haoqi
this child curious
the child is curious
b. 01 xiang kankan bao li shi shemo
want see bag in is what
(he) wants to see what's in the bag
c. 02 ba bao fang-zai di-xia
OM bag put-at ground-down
(he) puts the bag down on the ground
d. 03 jiu da-kai 04 le
just open PERF
(he) opens (the bag)

The subject of (3a), "the child", serves as referent for the unspecified subjects (01-03) which are easily recoverable from the context. Generally, there is only one participant in such cases.

Secondly, when more than one human participant is involved within an imposed episode, the human central character is normally referred to by either a lexical pronoun or zero anaphor, while the human non-central character is often reinstated with either an NP when ambiguity may result, or a zero when there is no room for ambiguity. For example,

4) a. zhe haizi cong jia-li chu-lai
this child from home-in come-out
b. 01 zou-dao jie-shang
walk-to street-on
the child leaves home and 0 walks on the street
c. 02 pengjian yiwei funu
meet a woman
d. 03 lingzhe xuduo dongxi
carry many thing
(he) meets a woman carrying a lot of things
e. ta geng zhe funu dazhaohu
he with this woman greet
f. 04 xiang bangmang
want help
he greets the woman and 0 wants to help
g. nage furen hen gaoxin
that woman very happy
h. 05 gei ta yige bao
give him a bag
the woman is very happy and 0 gives him a bag
i. ta lingzhe bao
he carry bag
j. 06 gengzhe furen zou
follow woman walk
he carries the bag and 0 follows the woman

The central character is established in (4a) with an NP and then maintained with lexical pronouns (in (4e), (4h) and (4i)) and zero anaphors (01, 02, 04 and 06) throughout the passage; the non-central character, after being introduced in (4c), is referred to again in the passage by three more NPs and two zero anaphors (03 and 05). The interpretation of all the zero anaphors is straightforward, and the listener has no problem identifying their referents. However, lexical pronouns are seen to be preserved for the central character, although both participants were activated at the moment of narrative production and both were competing for focal attention.

Thirdly, within an imposed episode when one of the two referents that have entered focal attention is non-human, it is very rarely referred to by a lexical pronoun, but normally by a zero anaphor or an NP. For example,

(5) a. ranhou ta zhaodao le nazhi cangying
then he find PERF that fly
b. 01 you jixu zhui 02
again continue chase
c. (0 bu zhidao) 03 da-si 04 meiyou
no know kill or-not
Then he finds the fly and 0 continues to chase (it). (I don't know) if (he) kills (it) or not.

(6) a. tamen ba qiu lao chulai
they OM ball scoop out
b. ranhou 01 02 na chu wuzi
then take out room
c. 03 zai yuanzi li ken nage qiu
at yard in eat that ball
They scoop the ball out, 0 take (it) out of the house and then 0 eat the ball in the backyard.

The non-human referent, "the fly", is left unspecified (02 and 04) in (5b) and (5c) respectively because it has been established in (5a) and is readily recoverable from context. It is the same case with the zero anaphor 02 in (6b), which refers to the inanimate referent "the ball" in (6a). However "the ball" is referred to again by an NP in (6c), which is still within the imposed episode and assumed to be in focal attention. The reason for the occurrence of the NP is that semantically the main verb in (6c), *ken* ("eat") requires two arguments, an agent and a patient; and pragmatically a zero anaphor in the object position of (6c) will be taken to refer to something edible, which can hardly be a ball. Therefore a zero referring to the ball in (6c) would cause confusion for the listener, and had to be specified with an NP. Nevertheless if the speaker had described that the ball was wrapped with sticky candy, he might have used a zero anaphor in (6c). This is indeed the case. Example (7) below is an excerpt from another subject's on-line task, where "the ball" is left unspecified (03) in (7d).

(7) a. tamen ba qiu cong guo-li na chulai
they OM ball from pot-in take out
b. qiu-shang zhan le hen duo nianhuhu de tang
ball-on stick PERF very much sticky of candy
They take the ball out of the pot, and the ball is stuck with some sticky candy.
c. ranhou tamen 01 na chuqu
then they take out
d. 02 zai huayuan li chi 03
at garden in eat
They then take (it) out and eat (it) in the garden.

Once again, we see that lexical pronouns in examples (5)-(7) refer only to the human central character. Although in each of the above examples, lexical pronouns replacing zero anaphors would not cause grammatical errors, the Mandarin speaker does not normally do so since a passage full of third person pronouns ta would sound redundant and awkward on the one hand, and the same pronunciation of the third-person pronouns would leave room for ambiguity on the other.

Furthermore, there are some cases in which a zero anaphor cannot normally be replaced by a lexical pronoun. First, as Chao (1968) observes, when the third person singular pronoun *ta* is used as a pronoun for inanimate object ("it"), it occurs mostly in the object position and very rarely as subject (p.633). However, when a zero anaphor is used to refer to an

inanimate object, it can very well take the subject position. For example,

(8) a. nanhai ba qiu da-gei nuhai,
boy OM ball hit-to girl
b. nuhai you ba qiu da huilai
girl again OM ball hit back
The boy shoots the ball to the girl, and the girl shoots the ball back.
c. huran, qiu ji-zhong le yishan chuangzi
suddenly ball hit-right PERF a window
d. 0 ba boli dasui le
OM glass break PERF
Suddenly, the ball hits a window and 0 breaks the glass.

(9) a. ta baba zuo qilai
his dad sit up
b. baozhi cong ta tou-shang luo xialai
paper from his head-on fall down
c. 0 sa le yidi
spread PERF everywhere
His dad sits up. The newspapers fall off his head and 0 spread all over the place.

Second, the object of a prepositional phrase denoting place and direction is either an NP or a zero anaphor, but very rarely a lexical pronoun. For example,

(10) a. tamen pa-zai chuangzi-shang
they lean-at window-on
b. 01 wang 02 li kan
toward in see
They lean in at the window and 0 look into (it).

(11) a. nuhai ban-lai yige dengzi
girl move-over a stool
b. 01 rang ta zhan 02 shangqu
let him stand on
The girl moves a stool over and 0 lets him stand on (it).

(12) a. zai ta fanneng baozhi de shihou
at he rummage paper of time
b. cangying cong 0 zhong fei chulai
fly from among fly out
Just as he rummages through the papers, the fly flies out from among (them).

All the three zero anaphors, 02 in (10) and (11), and 0 in (12) that refer to "the window", "the stool" and "the newspapers" respectively, can be replaced by the NPs, but not normally by lexical pronouns *ta* ("it") or *tamen* ("them").

The above discussion with examples illustrates that zero anaphors in Mandarin discourse are more versatile and used more widely than lexical pronouns: they can refer to human, non-human and inanimate referents, they can take various grammatical positions of a sentence, and they can replace words, phrases, clauses and even sentences. The results of the present experiment show that of all tokens counted from the Mandarin data, zero anaphora accounts for 30%, which is three times more than the proportion of lexical pronouns (10%). The results support Li and Thompson's (1979:322) claim that zero anaphora in discourse must be regarded as the normal, unmarked situation and lexical pronouns as the exception.

Since lexical pronouns are used much less frequently than zero anaphora in Mandarin discourse, it should be easier to explain their occurrence than that of the massive zero anaphors. In other words, it should be easier to examine when a lexical pronoun is preferred over a zero anaphor in discourse by the Mandarin speaker. The question is raised and investigated by Li and Thompson (1979), based on data provided in modern Mandarin texts and native Mandarin speakers' judgements. The present study attempts to supplement their solution by examining data collected during Mandarin speakers' narrative production.

6.2. When is Zero Anaphora Not Preferred? -- The Occurrence of Lexical Pronoun

6.2.1. Cognitive constraints

The Mandarin narrative production data which have been examined so far make it very clear that although lexical pronouns occurred much less frequently in discourse than zero anaphors, they were used almost exclusively to refer to the human central character. Table 6.1. below shows the average proportion of lexical pronouns versus zero anaphora for the two Mandarin groups.

	Hum-Cent	Hum-NC	Non-Hum	Inanimate	Total
NP	524	504	266	1007	2301
PRON	413	25	5	6	449
ZERO	816	169	86	114	1185
TOTAL	1753	698	357	1127	3935
% PRON	23.56	3.58	1.40	0.53	11.41
% ZERO	46.55	24.21	24.09	10.12	30.11

Table 6.1. The Average Proportions of Lexical vs. Zero Pronouns for the Mandarin Groups

It has been said and taken for granted that Mandarin lexical

pronouns are often used to refer to animate referents, but rarely to inanimate objects. However, as shown in Table 6.1. above, that is not entirely true. The present experimental data reveal that there is a huge difference between the proportions of lexical pronouns for the human central referent and the remaining referents; however, there is not much difference among those proportions for the human non-central, non-human and inanimate referents. The present study argues that it is cognitive processes of attention and memory that underlie the difference in the distributions between the human central and the other referents. As has been discussed in the past few chapters, the human central character has a privileged place in memory: it is frequently attended to and empathized with by the narrator, and consequently it is very frequently pronominalized (70% of all tokens of the central referent are pronominals, but pronominals for other referents only amount to 10-25%). Even when the central character and one other referent enter focal attention at the same moment, lexical pronouns are not assigned randomly: the central character is more likely to be realized by a pronoun and the other referent usually by an NP in order to keep them distinct and avoid ambiguity. In other words, the more attenuated marking material is, in most cases, sufficient to maintain the central, focal character.

6.2.2. Discourse constraints

Although lexical pronouns in Mandarin discourse are used mostly for the central character, the question remains as to why and when a lexical pronoun is preferred over a zero anaphor by the Mandarin speaker when there is only a single referent involved. For example,

(13) a. zhege haizi lai-dao keting li
this child come-to living-room in
the child comes to the living-room
b. 01 kanjian yige cangying
see a fly
(he) sees a fly
c. ta xiang da cangying
he want swat fly
he wants to swat the fly
d. yinwei ta bu gou gao
because he not enough tall
because he is not tall enough
e. 02 jiu zhan-zai yige dengzi shang
just stand-at a chair on
(he) stands on a chair
f. 03 ju-qi yizhi cangying pai
raise-up a fly swatter
(he) raises a fly-swatter
g. 04 zhunbei da nage cangyi
ready swat that fly
and (he is) ready to swat the fly

This excerpt describes a pair of pictures in the Even condition (i.e. an imposed episode), where there are two referents. Since the non-human referent "the fly" was always reinstated by NPs, the central referent could be maintained by zero pronouns all along without causing ambiguity. However, both zero and lexical pronouns maintain reference for the central character. Here is one more example,

(14) a. zhege nanhai hui qiu tai meng
this boy return ball too hard
the boy hits back the ball too hard
b. 01 ba qiu da-jin le yishan chuangzi
OM ball hit-in PERF a window
and (he) hits the ball into a window
c. yushi ta ganjin pao guoqu
so he hurry run over
d. 02 pazhe chuanghu
lean window
so he rushes over and 0 leans against the window
e. 03 wang limian kan
toward inside see
f. 04 zhao nage qiu
find that ball
(he) looks inside, trying to find the ball.

The sequence of clauses resembles very much a 'topic chain', where the topic is established in the first clause and serves as referent for the unrealized topics in the following clauses, except that there is a realized topic in (14c). What makes the Mandarin speaker use a lexical pronoun at such a point, where the unspecified referent seems to be readily recoverable? If we examine the above two excerpts carefully, we notice that there is a discontinuity between clauses preceding and following the lexical pronoun. For example, in (13) the first two clause describe the action of "the boy", but (c) expresses *his* state of mind (*he* wants to do something). Such a subtle transition and slight thematic discontinuity present in between (13b) and (13c) was marked by a lexical pronoun. Just because Mandarin speakers employ zero anaphora frequently, leaving quite a great deal of (old/given) information unspecified in discourse, the lack of information available in ellipsis makes the Mandarin speaker more sensitive to subtle discourse or thematic discontinuity, and apt to signal it with more marking material. The present study argues that it is this discontinuity which actually represents a type of (discourse or thematic) boundary, more fine-tuned and subtle than an episode boundary, that triggers the use of a lexical pronoun at such a point. Such a discourse boundary is most commonly one of the two kinds: a switch of descriptive mood or a transitional point (cf. 'Conjoinability' by Li and Thompson, 1979:331ff). These will be discussed in detail in the following sections.

6.2.2.1. Switch of descriptive mood

The present experimental data reveal that a switch of descriptive mood includes a switch of description from the appearance of a participant to his/her activities; from actions or events to states of mind; from foreground to background information or vice versa; and also from the story to the narrator's comments. Such a switch signals a slight thematic discontinuity between consecutive clauses and a lexical pronoun is preferred at such a point to mark the boundary. For example,

(15) a. yige nanhai zai jie-shang zou
a boy at street-on walk
a boy is walking on the street
b. 01 chuizhe koushao
blow whistle
(he) is whistling
c. ta chuanzhe beidai ku
he wear suspender trousers
he wears trousers with suspenders
d. 02 zhazhe chao-tian xiaobian
tie to-sky pony-tail
(he) has a pony-tail sticking up (on his head)
e. 03 hai shi qianmian nage nanhai
still is before that boy
(he) is still the boy (we talked about) before
f. ta kanjian yige lao popo ...
he see a old woman
he sees an old woman

Only one referent is involved in (15a)-(15e). The first two clauses describe the actions of the referent, but the third clause starts to describe the appearance of the referent. Such a switch is marked by a lexical pronoun in (15c). Later in (f), the narrator finishes describing the child and switches back to the activities of the child. Again at this point, a lexical pronoun is used. Let us look at another example.

(16) a. zhe haizi da-kai koudai
this child open bag
the child opens the bag
b. turan pa-chu yizhi da pangxie
suddenly climb-out a big crab
out climbs a big crab
c. 01 zai tade shuo-shang zhua le yixia
at his hand-on scratch PERF once
(it) pinches his hand
d. ta ganjin ba pangxie sai huiqu
he hurry OM crab put back
he hurriedly puts the crab back

e. 02 zha-hao koudai
tie-well bag
(he) ties the bag
f. 03 gan-shang mama
catch-up mom
(he) catches up with his mon
g. ta dagai shi xiazhe le
he maybe is scared PERF
he may be scared
h. 03 yifu hen jushang de yangzi
a very depressed of look
(he) looks very depressed

Once again, we see that (15d)-(15h) involves only one referent, but a lexical pronoun occurs in (15g). The reason is, as is evident from the passage, that the last two clauses contain the narrator's comments and the preceding clauses describe the story. The change of the perspective is marked by a lexical pronoun in (15g).

6.2.2.2. Transitional point

Transitional points also represent slight and subtle thematic discontinuities or boundaries in narrative discourse. They usually indicate minor transitions between clauses in time, contrast, manner, cause and result. Most of these transitional points are introduced by adverbial phrases such as *ranhou, houlai* ("later"); *keshi, danshi* ("but"); *yuyu, yinwei* ("because"); *jieguo, suoyi* ("so"); *zheyang, zhemozhe* ("like this", "in this way"), etc. Such a transitional point is commonly marked by a lexical pronoun. For example,

(17) a. zhe liangge haizi dazhe dazhe
this two kids play play
while the two kids are playing
b. 01 ba qiu da-jin fazi li le
OM ball hit-in house in PERF
(they) hit the ball into the house
c. tamen weile zhao qiu
they because find ball
because they want to find the ball
d. 02 pa-zai chuangzi shang
lean-at window on
(they) lean in at the window
e. 03 kan nage qiu zai nali
see that ball at where
(they) try to see where the ball is

(18) a. canying luo zai baozhi shang
fly fall at paper on
the fly is falling on the newspapers
b. ta jiu tiao qilai
he just jump up
c. 01 juzhe paizi
raise swatter
he jumps up and (he) raises the fly-swatter
d. 02 chao baozhi henghengde da xiaqu
towards paper very-hard hit down
(he) just hits hard at the newspaper
e. danshi ta mei dazhe cangying
but he not hit fly
but he does not hit the fly
f. 03 que dazhe le baozhi dixia de yige ren
just hit PERF paper under of a man
(he) hits a man under the newspapers

(19) a. haizi beizhe yige daizi
child carry a bag
the child carried a bag
b. 01 geng-zai nuren houmian
follow-at woman behind
(he) follows the woman
c. 02 guyi manmande zou
on-purpose slowly walk
(he) walks slowly on purpose
d. ranhou ta zai yige qiang-jiao ting xialai
then he at a wall-corner stop down
then he stops at a street corner
c. 03 fang-xia daizi
put-down bag
(he) puts the bag down

Each of the transitional points at (17c), (18e) and (19d) in the above excerpts is marked by a lexical pronoun, which signals cause, contrast and time transition respectively. The above examples are sufficient to show that though Mandarin speakers use zero anaphora extensively in discourse, they are especially sensitive to the presence of a minor and slight thematic discontinuity or discourse boundary, and make an effort to mark it. It is the principle of discourse boundaries that governs, to a large extent, the occurrence of lexical pronouns when the attention is sustained, and when there is only one referent involved in narrative or discourse production.

6.3. Syntactic Constraints

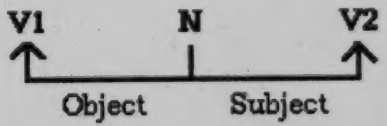
Apart from the cognitive and discourse constraints that have been discussed above, there are some syntactic constraints that require the occurrence of a lexical pronoun in a Mandarin sentence. Certain positions in a sentence must be lexically filled. The following section describes those syntactic conditions.

6.3.1. Pivotal constructions

A pivotal construction, as defined by Chao (1968), "consists of a succession of a verbal expression V1, a nominal expression, and another verbal expression V2, with the nominal expression serving at once as object of V1 and subject of V2" (p. 124). For example, in (20) the lexical pronoun *ta* ("him") serves as both the object of *pai* ("delegate") and subject of *zuo daibiao* ("as representative").

(20) women pai ta zuo daibiao.
we delegate him as representative
we delegate him to be representative.

The structure and relations between elements in the pivotal construction can be put in the following configuration.



In the construction, V1 is called a pre-pivotal verb, V2 a post-pivotal verb, and N a pivotal noun. In general, pre-pivotal verbs are a limited class, which are of the "cause to" type such as *rang* ("let"), *zhun* ("permit"), *yao* ("want"), *bi* ("compel"), *mingling* ("order"), etc. The position of N (pivotal noun) in the configuration must be lexically filled, as with *ta* in (20). A zero anaphor appearing in such a position will result in a grammatical error of the sentence such as (21) below.

(21) *woman pai 0 zuo daibiao.
we delegate as representative

There are about 5% of all lexical pronouns counted in the Mandarin experimental data which are used in the pivotal construction. For example,

(22) a. ta xiang bang lao taitai
he want help old lady
he wants to help the old lady
b. lao taitai hen gaoxin
old lady very happy
the old lady is very pleased
c. 0 jiu rang ta ti yige bao
just let him carry a bag
(she) lets him carry a bag

(23) a. na nanren zebei ta
that man scold him
the man scolds him
b. 0 binqie mingling ta ba baozhi jian qilai
and order him OM paper pick up
and tells him to pick up the newspapers

The lexical pronoun *ta* ("he") in (22c) and (23b) after the pre-pivotal verb is obligatorily required by the pivotal structure.

6.3.2. Object of prepositional phrases

A preposition in Mandarin Chinese "does not usually omit its object" (Chao, 1968:751). A prepositional phrase often appears in the following clause construction.

N1 PREP N2 V

where N1 is a nominal representing the subject of the clause, N2 is a nominal representing the object of the prepositional phrase, and V is the predicate of the clause. Traditionally, the preposition in the structure is also called a co-verb (see Chao, 1968:335, Li and Thompson, 1974), which, together with V, is regarded as a V-V series. The N2 position in the above construction must, in most cases, be lexically filled. For example,

(24) wo geng ta zou.
I with him go
I go with him

(25) zhe dui women hen fangbian.
this for us very convenient
this is very convenient for us

(26) na gou chao ta pao guoqu.
that dog toward him run over
the dog runs towards him

The presence of the lexical pronouns *ta* ("him") in (24) and (26), and *woman* ("us") in (25) is obligatory. The following sentence, with a zero anaphor in

N2 position is ungrammatical.

(27) *wo geng 0 zou.
I with go

In the Mandarin data, about 10% of all lexical pronouns occur in such prepositional phrases with the prepositions such as *he, geng* ("with"), *xiang, chao* ("towards"), *cong* ("from"), *dui, duiyu* ("to/for"), etc. For example,

(28) yige nuren chao ta zou guolai.
a woman towards him walk over
a woman walks towards him

(29) xiao nuhai geng ta pa-jin chufang
small girl with him climb-in kitchen
the little girl climbs in the kitchen with him

(30) luzi-shang de guo duiyu tamen shi tai gao le
stove-on of pot for them is too high PERF
the pot on the stove is too high for them

On the other hand, a small number of prepositions such as *bei, shou* (demoted subject marker in a passive structure like "by" in the English passive) and *ba* (object marker of a preposed object) can sometimes omit their object. For example,

(31) women shou ta/0 pian le
we PM him fool PERF
we were fooled (by him)

(32) zhe chenyi po le, qing ni ba ta/0 bu qilai.
this shirt wear-out PERF please you OM it mend up
the shirt is worn out, please mend (it)

The object omission after *bei, shou* are common, while the zero object after *ba* is quite rare although the sentence without the object of *ba* is still grammatical. In the present experiment, none of the Mandarin speakers omitted the object after *ba*, but about half of the *bei/shou* structures have a zero object of the preposition. For example,

(33) yizhi pangxie cong bao li pa chulai,
a crab from bag in climb out
0 ba ta xiale yi-tiao.
OM him scare a-jump
A crab climbs out of the bag and scares him

(34) na daren cong shafa shang zuo qilai
that adult from sofa on sit up
0 ba ta xunchi yitong
OM him scold a-spell
the adult sits up in the sofa and scolds the child

(35) qiu bei tamen da-jin le chufang.
ball PM them hit-in PERF kitchen
the ball was hit into the kitchen

(36) na ren bei 01 jinxin le, 02 feichang shengqi
that man PM wake PERF very angry
the man was woken by (the child) and very angry

In conclusion, the absence of zero anaphora is also governed by syntactic constraints as illustrated in the above analysis.

6.4. Summary

The present chapter has examined a language specific issue: the Mandarin pronominal system. It has demonstrated that zero anaphora in Mandarin narrative discourse occurs much more frequently than lexical pronouns; and its occurrence and interpretation can not be accounted for solely by syntactic properties, but to a great extent by semantic, pragmatic and discourse factors.

The present chapter has also investigated the question of when and why zero anaphora does not occur, i.e., when and why a lexical pronoun is preferred by the Mandarin speaker, since lexical pronouns in Mandarin discourse are more like "exceptions". The present study argues that cognitive and discourse as well as syntactic constraints govern the non-occurrence of zero anaphora and determine the speaker's choice between zero and lexical pronouns at times when attention is sustained.

CHAPTER SEVEN

CONCLUSION

7.0. Preface

This dissertation has examined, based in part on Tomlin's (1987) study, how speakers of English and Mandarin choose anaphors in their narrative production to refer to entities previously introduced in discourse. It has demonstrated, through analyzing data obtained from two experimental tasks, that a speaker's anaphoric choice is determined by his cognitive processes of attention and memory, by his estimation of the listener's current knowledge and by pragmatic information provided in discourse context. The major findings and points of interest of the present study are summarized in the following sections.

7.1. The Major Findings

It was found that, first of all, episodes exist as separate memory units/chunks in story processing. In the experiment, the story was memorized as episodes, and episodes were shown to be dominated by macropropositions. Subjects were in general highly sensitive to episode boundaries regardless of how the series of storytelling pictures was segmented, and they encoded episode boundaries differently from the rest of the within-episode material. The psychological reality of episodes provides a sound foundation for the episode theory explored in the present study.

Secondly, episodes as memory chunks represent sustained attention spans, which control a speaker's anaphoric choice during narrative production as reflected in the experimental data. The speaker uses more marking material (e.g., an NP) at an episode boundary to reinstate reference since the episode boundary breaks sustained attention and therefore demands more encoding effort; the speaker uses less marking material (e.g., a pronoun or a zero anaphor) within an episode to maintain reference since sustained attention requires minimal encoding effort.

It was also found that, thirdly, the influence of humanness and especially that of centrality of humanness as attention factors conspire with the episode boundary effect to determine speakers' anaphoric choice. Since there are limitations to activation and attentional resources, the number of referents being activated and receiving focal attention are limited. It was found that human referents are more likely to attract the narrator's attention than non-human ones, and they are more prone to the episode boundary effect. Non-human referents are seldom the topic of the story, and

difficult to draw attention, and are consequently nominalized frequently even within episodes. On the other hand, human central referents are more likely to get into attention and stay in focus than non-central ones, and they are therefore more frequently maintained by pronominals within episodes than are non-central referents.

The cognitive processes of attention and memory that control speakers' anaphoric choice appear to be universal based on the results of the present study. Subjects behaved the same way in their episodic organization and selection of anaphors during narrative production regardless of what language they used.

7.2. Language-Specific Issues

Though cognitive processes of memory and attention appear universal, language-specific characteristics have also been found in the present study. The particular issue examined and discussed is pronominalization in Mandarin discourse, where subjects used lexical pronouns fairly restrictedly and zero anaphora very extensively. This is quite different from pronominalization in English where the occurrence of zero anaphora is conditioned by syntactic properties, and lexical pronouns are some of the most frequently occurring lexical units (Kucera & Francis, 1967). The use of pronominals is the only major difference found in anaphoric choice between English and Mandarin subjects in their narrative production. The present study has not only demonstrated that the occurrence and interpretation of zero anaphora in Mandarin are largely accounted for by semantic, pragmatic and discourse factors, but has also proposed some general principles that govern the occurrence of lexical pronouns, the 'non-norm' of the Mandarin pronominal system.

7.3. Givon's Distance Model

Though not dealt with intensively, Givon's (1981, 1983) continuity model based on the measurement of referential distance between referents has been applied to the part of the present experimental data (i.e., the data of the recall task where no episode boundaries were imposed). The results show that referential distance does not account for the differential use of nominals and pronominals. While increasing the time or distance between subsequent references does increase the likelihood that NPs will occur for the second reference, there was still a large number of NPs appearing with only one clause separating them from their antecedents, as was also the case with pronominals. The distance model does not offer any systematic explanation to account for those cases, and cannot therefore be considered an adequate model for reference management in discourse.

7.4. Closing Remarks

While the present dissertation adds to our understanding of the effect of cognitive processes of memory and attention on discourse production, there remain, of course, a number of problems that have not been addressed. First of all, the identification of episode boundaries in this study by video-cuts is independent of linguistic information, and therefore avoids the problem of circularity. However, how to define and identify episode boundaries in different genres of texts is still not clear at the moment. The second problem is related to the first one. The present study has not offered an analysis of text data for selecting anaphors in written discourse due to the difficulty of providing explicit and structure-independent means of identifying episodes and episode boundaries. Finally, the fact that the listener did not actively participate in the experimental tasks makes some phenomena hard to explain. For example, subjects occasionally used two lexical pronouns of the same gender to refer to two human referents at the same clause within an episode. Without the immediate feedback from the listener, we could hardly tell why the speaker did not resolve ambiguity for the listener at the moment, whether or not that created problems for the listener, and how the listener could uniquely identify the referents. It is hoped that these and other remaining problems can be pursued in future studies.

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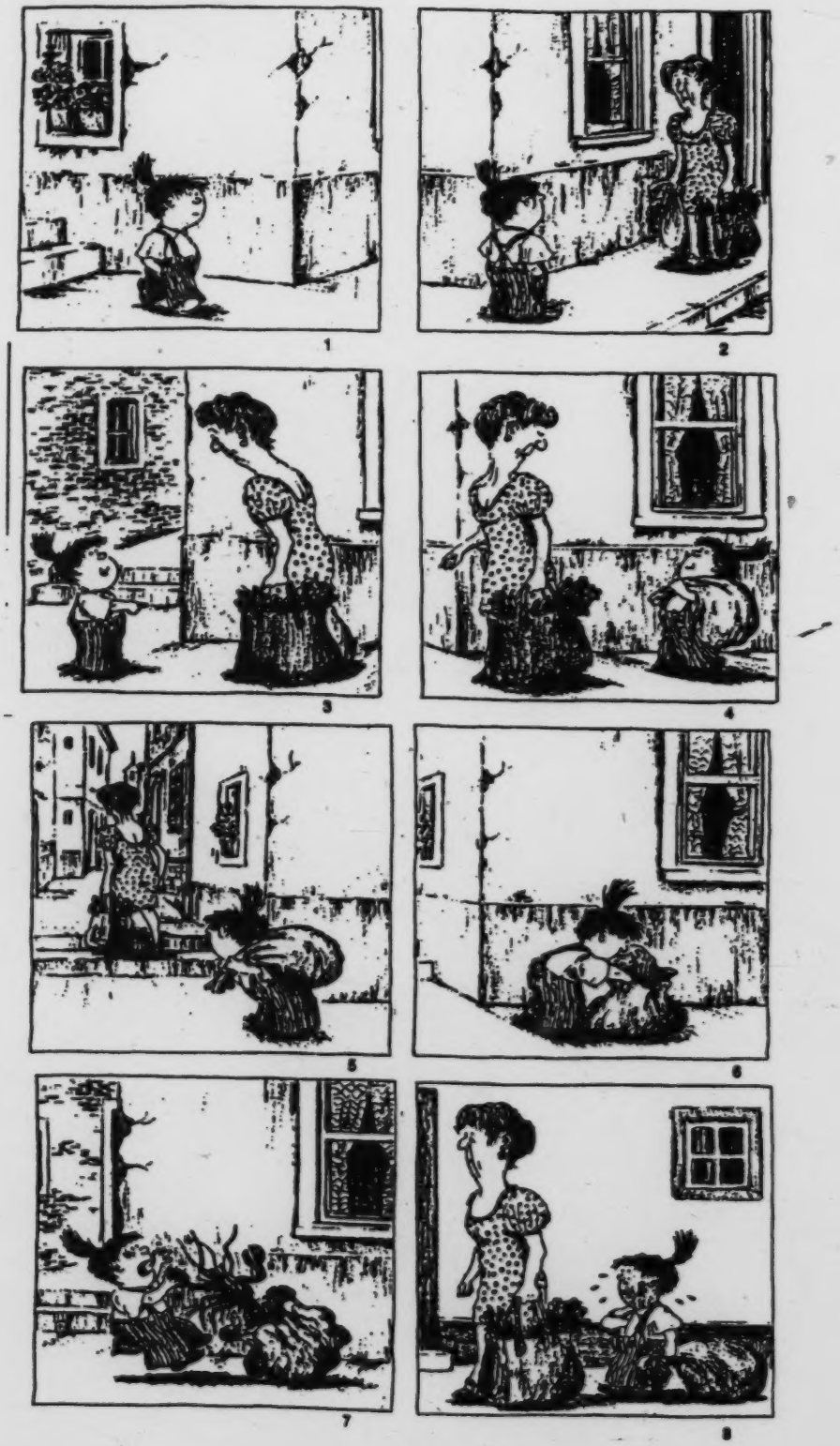
Appendix A

(1) Alex Pumpernickel ... In a Sticky Situation

(2) Alex Pumpernickel ... Swat !

(3) Alex Pumpernickel Lends a Hand



APPENDIX B

INSTRUCTION

This is a study about how people use language to describe what they experience. It involves your participation in two speaking tasks. The first one is a description task, and the second one is a recall task.

(1) The set of pictures you are about to see is taken from a picture story book. Your task is to describe each individual picture as it appears on the Macintosh screen. When you finish with one picture, please press the mouse and the next picture will appear on the screen. Do this until you finish the whole story. At the end of the story, a sentence will appear on the screen, telling you to stop.

(2) When you finish telling the story from the pictures, I would like you to retell the story from the beginning. This task is to find out how people use language to describe what they have seen. Please take time to retell the story as completely as possible.

Thank you very much for your time and cooperation.

APPENDIX C

English Group (Even Condition)

Subject #3:

EPIS	PROP	TEXT
1	1	There were once two friends
1	2	0 playing with a ball and two rackets
1	3	first the little girl shot it to her friend
1	4	and the friend returned it
2	5	when the friend returned it
2	6	she missed her friend
2	7	and it smashes a window in a house [ ]
2	8	that was behind the girl
2	9	the second friend went
2	10	to look to see
2	11	where the ball had gone
2	12	and what was inside the building
3	13	they found
3	14	the ball had landed in a pot of food
3	15	0 looking something like stew
3	16	so the girl got onto a stool with the help of her friend [ ]
3	17	who is holding the stool
3	18	and tried to scoop the ball out from on top of the stove
4	19	the friend got the ball out with the spoon
4	20	but 0 ended up dripping some of the stuff from inside the pot all over the floor
4	21	and the two friends went back outside
5	22	there was a little girl
5	23	0 standing on top of a chair [ ] in the living room and a couch with newspapers on top of it
5	24	that didn't have any arms
5	25	she is using a fly swatter
5	26	to try to swat some sort of insect [ ]
5	27	that was flying around
5	28	she swung
5	29	she jumped
5	30	to try to get it
5	31	she jumped towards the couch

EPIS	PROP	TEXT
6	32	she landed on top of the couch
6	33	but it wasn't just the newspapers
6	34	the insect flew away
6	35	but she smacked the top of the newspaper
6	36	0 waking up
6	37	what looks like her father [ ]
6	38	who got up
6	39	and the newspaper went everywhere
6	40	and she looked worried
7	41	the girl wakes her father
7	42	the father looks quite angry
7	43	she looks quite embarrassed
7	44	and the newspaper are all over the floor
7	45	and she is trying to pick them up
7	46	but it's turning into some sort of a pile
7	47	the father looks confused
8	48	She tosses the pile to her father
8	49	and they land all over the place
8	50	and she continues after the fly with her fly swatter once again in hand
8	51	the father is covered in newspaper
8	52	0 sitting still on the couch
9	53	the little girl is walking around the corner
9	54	there are two steps inside and a window with flowers, .. flower pots with flowers in them
9	55	she is turning the corner of the house
9	56	and around the corner she sees a lady
9	57	0 wearing a dress
9	58	and 0 carrying something
10	59	she points to the lady's bags
10	60	.. 0 might be her mother
10	61	and 0 looks like
10	62	she is asking her
10	63	what's in them
10	64	and the mother is responding
10	65	the mother hands her one sack
10	66	maybe she is asking
10	67	if she can help
10	68	the little girl has a sack
10	69	and she is walking behind the lady
10	70	and the lady is still talking to her

EPIS	PROP	TEXT
11	71	the lady continues down the street after turning the corner
11	72	and the little girl decides
11	73	to put the bag down
11	74	and open to see
11	75	what's inside
12	76	a lobster comes out
12	77	and 0 grabs her by hand
12	78	and she yells out
12	79	so she closes the bag
12	80	and 0 walks in tears behind the lady with the bag closed now
12	81	and the lady is carrying the other bag full of things.

Retell:

The first story was about two little children playing with rackets and a ball. The first child shot it to the second child who reflected it back, but it went over her head, passed her and it broke a window. The ball went inside to .. of the kitchen and it landed inside of a pot. The little children went in through, (.,) were looking into the window and saw it there. They went inside. One friend climbed the stool and the other friend held the stool. The little girl used a spoon to scoop the ball out of the pot of food. And they took it outside but it was covered with the food.

The second story. There was a little girl 0 standing on a chair in a living-room. There was a couch inside with newspapers. And she is after a fly. She is using a fly swatter. And she swats towards the fly but 0 misses. And she jumps off the chair and ends up 0 swatting the top of the newspapers. Unfortunately there is somebody underneath the newspapers, probably her father, who jumps when the top of the newspapers were slapped and 0 sits up and the newspapers fall everywhere. He looks very angry. The girl looks fairly upset. So she starts to try to straighten the newspapers, but she looks like she kind of gives up, (uh..) gathers them together, throws them towards the man. And he is just sitting there, not quite sure what's going on. And she continues to pursuit of the fly with the fly- swatter (..) or the insect.

Third story. The little girl is standing at the corner of a building. There are two stairs inside. She turns the corner and sees a lady coming towards her carrying two bags. One is closed, one is open. Both are full of things. She talks to the lady. (..) I am not quite sure what she says. It's either if she can help her or what's in the bag. But the lady ends up handing her one of her bags. Curiosity overwhelms her. And she opens the bag and out pops a lobster who jumps onto one of her fingers. She is in quite a bit of pain. She closes the bag up and follows the lady who still has the bag full of things as we can see. This time she is carrying the lobster bag closed.

Subject #3 (Written Recall):

EPIS PROP TEXT

1 1 you yi-tian, jeien he steven zai yiqi da wangqiu
have one-day Jason and Steven PROG together play tennis
One day, Jason and Steven are playing tennis

2 2 turan, jeisen dachule ge feichang gao de qiu
suddenly Jason play a very high of ball
suddenly Jason hits the ball very high

2 3 danshi steven chengqongdi jiezhule zhege qiu
but Steven successfully receive this ball
but Steven receives it successfully

2 4 tamen jixu da
they continue play
they continue to play

2 5 jeison you dale yige hen quai de qiu
Jason again play a very quick of ball
Jason has another quick serve

2 6 feichang buxinde shi zhege qiu da-jinle yige (..)
very unfortunately is this ball hit-in a
dajinle tamen sheng houde fangzi (..) cong chuangzi
enter their body behind house from window
zhong dajin fangzi
in enter house
unfortunately the ball enters the house behind them, ...
enters the house through the window

2 7 0 ba boli gei dasui le
OM glass PART break PERF
it breaks the window

3 8 yushi jeisen he steven cong posuide chuangzi pa-jinle fangzi
so Jason and Steven from broken window climb-in house
so Jason and Steven clime into the house from the broken
window

3 9 tamen faxianle
they find

3 10 zhege qiu luo jinle yige da guanr li
this ball fall into a big jar in
they find out that the ball has fallen into a big jar

3 11 tamen ji wu hou
they enter room after

3 12 0 faxian zhe wuzi feichang youqu
find this room very interesting
after they have entered the room, they find it very interesting

EPIS PROP TEXT

3 13 0 faxian zhe wu li you ge guanr
find this room in have a jar
they find out that there's a jar in the room

3 14 guanr li bu zhi you shenmo dongxi
jar in not know have what thing
there's something in the jar

4 15 yushi steven nale yige hen gao de dengzi
so Steven move a very high of stool
then Steven takes a very high stool

4 16 0 rang jeison zhan 0 shangqu
let Jason stand upon

4 17 0 kankan 0 limian shi shemo dongxi
see inside . is what thing
(he) lets Jason stand on (the stool) and see what's in the jar

4 18 jeison zai zhege guanzi li zhaoa, zhaoa
Jason at this jar in find find
Jaosn looks in the jar

4 19 ta turanjian faxian
he suddenly see

4 20 yuanlai tade qu jiu zai guanzi li
so his ball just at jar in
he suddenly sees that his ball is in the jar

4 21 ta ba zhe qu yong yigeng (..) yong yigeng
he OM this ball use a use a
xiao gun jiale chulai
small stick scoop out
he scoops the ball out with a small stick

4 22 danshi tamen feichang jinqidi faxian
but they very surprisingly find-out

4 23 zhege qiu-shang zhanle yilianchuande dongxi
this ball-on stick a-chain-of thing
but they are surprised to find out that there are something
sticky on the ball

5 24 jasen he steven cong chuangzi li pa chulai
Jason and Steven from window in clime out

5 25 0 zuo zai caodi shang
sit at grass on
Jason and Steven clime out from the window and sit on the
grass

5 26 ta-liangge kanshi yanjiu
they-two start research

5 27 zhexie zhan-shang 0 de dongxi shi xie shemo
those stick-on of thing is some what
dongxi
thing
they two starts to find out what's stuck on (the ball)

EPIS	PROP	TEXT
*5	28	yitian, Mary zai zijide jiali (..) wuzi li kan baozhi one-day Mary at own home room in read newspaper one day, Mary is reading newspaper at her own room
5	29	huran, laile yizhi cangying suddenly come a fly
5	30	0 zai wu li fei at room in fly a fly comes suddenly flying in the room
5	31	Mary zhaodao yizhi cangyingpa Mary find a fly-swatter
5	32	0 kaishi pa shang pa xia start clime up clime down
5	33	0 kaishi zhuida zhezhi cangying start chase this fly Mary gets hold of a fly-swatter and starts to chase the fly everywhere
5	34	huran zhezhi cangying huo-daole yi-dui baozhi-shang suddenly this fly fall-to a-pile newspaper-on suddenly the fly falls onto a pile of newspaper
5	35	zhexie baozhi zaluandi dui zai yige shafa shang those paper disorderly pile at a sofa on the paper are piled on the sofa disorderly
6	36	Mary padeyixia da zai baozhi shang Mary (ONOM) hit at paper on Mary hits the newspaper
6	37	ta feichang chijindi faxian she very surprisingly find
6	38	zhexie baozhi dongqilai these paper move
6	39	erqian 0 yuelaiyue gao and more-and-more high very surprisingly she sees the paper moving and gets higher and higher
6	40	oh, baozhi ziamian haiyou liwai yige ren paper under have another a man oh, there's a man under the newspaper
6	41	oh, yuanlai shi tade fuqin so is his father oh, that's her father

EPIS	PROP	TEXT
7	42	ta fuqin cong shafa-shang zuo-qilai her father from sofa-on sit-up his father sits up on the sofa
7	43	ta fuqin wen ta: "ni zai gan shem?" her father ask him you PROG do what her father asks her: "what are you doing?"
7	44	ta shuo: "wo zai da yizhi cangying." she say I PROG hit a fly she says: "I am chasing a fly."
7	45	ta fuqing shuo: "cangying zai nali?" her father say fly at where her father asks: "where is the fly?"
7	46	ta shuo: "keneng 0 zai baozhi xaimian." she say maybe at paper under she says: "maybe (it's) under the newspaper
8	47	yushi Mary kaishi zai dishangde baozhi li fanzhao(..) then Mary start at floor paper in rummage then she starts to rummage through the newspapers on the floor
8	48	0 zhaoa zhao find find
8	49	0 zenmo ye zhao bu-dao 0 how just find not (he) looks and looks, but just can't find (it)
8	50	ta jixu fan baozhi she continue rummage newspaper she continues to rummage through the newspapers
9	51	turan, nazhi cangying you feile qilai suddenly that fly again fly over suddenly the fly flies up again
9	52	Mary you qu zhui cangying Mary again go chase fly Mary goes on chasing the fly again
*9	53	Mary gandao feichang jusang Mary feel very depressed
9	54	cangying meiyou dadao fly not kill Mary is very depressed because the fly is not killed
9	55	ta juezhuizui zouchule jia-men she unhappily leave home-door she leaves the house unhappily
9	56	ta xiang qu sansanbu she want to walk she wants to take a walk

EPIS	PROP	TEXT
10	57	Mary zouzhuo she walk
10	58	yixia peng-dao ge lao popo just meet a old lady while she is walking she comes across an old lady
10	59	ta wen nage lao popo: "ni qu nalile?" she ask that old lady you go where she asks the old lady: "where have you been?"
10	60	lao popo gaoshu ta: "wo qu mai caile." old lady tell her I go buy grocery the old lady tells her: "I bought some grocery."
10	61	Mary shuo: "wo lai bang ni na yige daizi ba Mary say I come help you take a bag EX Mary says: "let me help you carry a bag."
10	62	lao popo shuo hao old lady say OK the old lady says OK
11	63	lao popo zai qianmian zou old lady PROG front walk
11	64	Mary zai houmian gengzhuo Mary PROG behind follow the old lady walks in front and Mary follows behind
12	65	dang Mary zou dao qiang-jiao de shihou when Mary walk to wall-corner of time
12	66	ta ba daizi fang-zai dixia she OM bag put-down ground
12	67	0 binqian da-kai daizi and open bag
12	68	0 kankan limain shi shemo dongxi see inside is what thing when Mary walks to the corner of the street, she puts down the bag and opens it to see what's in it
12	69	ta zhengzai fankan de shihou she PROG see of time
12	70	huran cong limian pa-chu yizhi dade pangxie suddenly from within clime-out a big crab when she is looking inside, a crab climes out
12	67	binqian zhezhi pangxie zai Mary lian-shang and this crab at Mary face-on henhendi zhale yixia ruthless scratch once and the crab scratches on Mary's face ruthlessly

EPIS	PROP	TEXT
13	68	Mary feichang gandao tengtong
		Mary very feel pain
		Mary is very painful
13	69	ta lian-shang liuzhuo lei
		she face-on flow tears
13	70	0 sheng-shang liuzhuo han
		body-on flow sweat
		she has tears in her face and sweats all over
13	71	danshi ta you bu gan shuo
		but she also not dare say
		but she does not dare not tell
13	72	0 zhihao zai huomian momodi renzhuo
		have-to at behind silently tolerate
13	73	0 genzhuo lao popo wang qian zou
		follow old lady toward front walk
		she) has to tolerate silently and continues follow the old lady.

Written Recall (and English translation):

Gushi 1: you yi tian, Jason he Steven zai yiqi da wangqiu. turan Steven da chule yige gao qiu, danshi Jason chenggong de jiezhu le zhege qiu. tamen you kanshi wan. Jason da chu yige feichang kuai de qiu, Steven meiyou jie dao zhege qiu. Zhege qiu da-jin le Steven sheng hou de wuzi li. qiu cong chuangzi fei-jin le wuzi, binqie 0 da-sui le chuangzi de boli. tamen cong da-sui de chuangzi wang jinqu, tamen kandao qiu luo dao le wuzi li yizhang zhuozi shang de yige da guanzi zhong. tamen cong chuangkou zuan jinqu. dan tamen gou bu-zhao zhuozi shang de guanzi. Steven zhaolai yige gao yizi, Jason pale shangqu. ta nazhe yige xiao gun, 0 zai guanzi limian zhao a, zhaoa, 0 zhao nage qiu. Zuihou Jason yong gun ba qiu jiale chulai. danshi tamen faxian qiu shang hai nianle yi lianchuan de dongxi. tamen cong chuangkou pa culai, 0 zuo zai caodi shang kanshi yanjiu zhexie dongxi.

Story 1: One day, Jason and Steven are playing tennis, Suddenly Steven fires a high shot, but Jason successfully receives the shot. Then they start playing again. Jason throws a very quick shot, Steven misses the ball. The ball flies into the house behind Steven. The ball flies into the room through a window, and breaks the window. They look into the window, they see that the ball falls into a big jar on a table in the room. They climb in through the window. But they cannot reach the jar on the table. Steven moves over a chair, and Jason climbs upon (it). He takes a small stick to stir in the jar and tries to find the ball. Finally, Jaosn takes out the ball with the stick. But they find that ball is stuck with some sticky stuff. They then climb out through the window and sit on the grass to study the stuff.

Gushi 2: yi tian, Mary zai wuzi li kan baozhi. turan fei-lai yige cangying. 0 zai wu li WENGWENG di feizhe. Mary zhao-lai yige ying-pai kanshi 0 pa shang pa xia di da cangying. cangying luodao le baozhi shang, Mary zhaozhe baozhi da le xiaqu. dan ta hen jingqi di faxian, baoshi kanshi manmandi dongle qilai. yuanlai xiamian you yige ren zai shuijiao. zhege ren jiushi Mary de fuqin. ta fuqin shengqi di wen ta: "ni zai zuo shemo?" Mary huida: "wo zai da cangying." "cangying zai nar?" tade fuqin wen. "zai baozhi shang." bian shuo, Mary bian zai baozhi dui li fanzhao nage cangying. danshi zengmo ye zhao bu da 0. jiu zai ta xian kai zuihou yizhang baozhi shi, nazhi cangying you fei zou le.

Story 2: One day, Mary is reading the newspaper in the room. Suddenly a fly flies around the room. Mary finds a fly-swatter and starts to chase the fly up and down. The fly falls onto the newspapers. Mary aims at the fly and swats (it). But to her surprise, the newspapers are moving slowly. So there is a man sleeping underneath. The man is Mary's father. Her father asks her angrily: "what are you doing here?" Mary says: "I am trying to swat a fly." "Where is the fly?" asks her father. "In the newspapers." While answering, Mary is looking for the fly among the newspapers. But she can't find it. Finally when she turns out the last page of the newspapers, the fly flies away.

Gushi 3: Mary feichang jusang,0 juezhe zu, 0 zou chule fangzi. ta yao qu wai mian zouzou, 0 qu sansan xin. 0 zouzhe, ta pengdao yige lao popo. ta wen, "lao popo, ni qu gan shemo le?" "qu mai caile," lao popo huida. "wo bang ni na yixie ba." 0 bian jiang, Mary bian na-guo yige bao, 0 0 kang zai jian shang, 0 geng zai lao popo huomian. 0 zai yige guaijiao de difang, Mary ba bao fang zai dishang, ta yao da-kai bao kan yi kan bao zhong jiujing shi shemo dongxi. ta gang da-kai bao, bao li tiao chu yizhi da pangxie. zhege da pangxie zhongzhongdi zai ta lianshang zhua le yixia. Mary gandao feichang tengtong, danshi ta you bu gan shuo, yan zhong liuzhe lei, sheng-shang tangzhe han, 0 momodi geng zai lao popo houmian 0 xiang qian zouqu.

Story 3: Mary is very depressed. She leaves the house and wants to have a walk outside. On the street, she meets an old lady. She asks: "What have you been doing, Granny?" "(I) went to buy some groceries," the old lady answers. "Let me help you carry something." While speaking, Mary takes over a bag and puts (it) on her shoulder, and follows the old lady. At a street corner, Mary puts the bag on the ground, she wants to open the bag to see what's in the bag. She just opens the bag, a big crab jumps out of the bag. The big crab piches her face fiercely Mary feels very painful. But she dares not make a sound. (She) has tears in eyes, sweating and following the old lady silently.